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Annual Report for FY14 NPDES Municipal Separate Storm Sewer System Permit

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List of Acronyms

ANS	Anacostia Naturalist Society
ARP	Anacostia River Restoration
BIBI	Benthic Index of Biological Integrity
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BUP	Bethesda Urban Partnership
CBT	Chesapeake Bay Trust
CCTV	Closed Circuit Television
CD	Compact Disk
CIP	Capital Improvement Program
CMP	Clarksburg Monitoring Partnership
CPV	Channel Protection Volume
CWF	Chesapeake Watershed Forum
CWP	Center for Watershed Protection
DA	Drainage Area
DEP	Department of Environmental Protection
DEPC	Division of Environmental Policy and Compliance
DHCA	Department of Housing and Community Affairs
DHS	Division of Highway Services
DOT	Department of Transportation
DPS	Department of Permitting Services
DGS	Department of General Services
DSWS	Division of Solid Waste Services
DTS	Division of Transit Services
ESD	Environmental Site Design
EMC	Event Mean Concentration
EMTOC	Equipment Maintenance and Transit Operations Center
EPA	Environmental Protection Agency
ESC	Erosion and Sediment Control
ESD	Environmental Site Design
FFG	Functional Feeding Group
FIBI	Fish Index of Biological Integrity

FMD	Fleet Management Division
FOG	Fats, Oils, Grease
FOSC	Friends of Sligo Creek
GIS	Geographic Information Systems
HEC-RAS	Hydrologic Engineering Center-River Analysis System
HUC	Hydrologic Unit Code
HVAC	Heating, Ventilation and Air Conditioning
IBI	Index of Biological Integrity
IDDE	Illicit Discharge Detection and Elimination
IPM	Integrated Pest Management
LID	Low Impact Development
MC	Mean Concentration
MCPS	Montgomery County Public Schools
MDE	Maryland Department of the Environment
MEP	Maximum Extent Practicable
M-NCPPC	Maryland-National Capital Park and Planning Commission
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MWCOG	Metropolitan Washington Council of Governments
NOI	Notice of Intent
NOVs	Notice of Violation
NPDES	National Pollutant Discharge Elimination
P2	Pollution Prevention
PHED	Planning, Housing and Economic Development
POSWP	Public Outreach and Stewardship Work Plan
ROW	Right of Way
SHA	State Highway Administration
SPA	Special Protection Area
SPCC	Spill Prevention Control and Countermeasure
SSO	Sanitary Sewer Overflow
SWM	Stormwater Management
SWPPP	Stormwater Pollution Prevention Plan
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load

TN	Total Nitrogen
TOC	Time of Concentration
TP	Total Phosphorous
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
UST	Underground Storage Tank
WIP	Watershed Implementation Plan
WLA	Wasteload Allocation
WMATA	Washington Metropolitan Area Transit Authority
WMD	Watershed Management Division
WQPC	Water Quality Protection Charge
WQv	Water Quality Volume
WTM	Watershed Treatment Model
ZTA	Zoning Text Amendment

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A. GIS Storm Drain System Mapping Associated With GIS Coverage (Part III.C.1), 1998 through February 2013
B. Urban Best Management Practices Associated with GIS Coverage (Part III.C.2)
C. Impervious Surfaces Associated with GIS Coverage (Part III.C.3)
D. Watershed Restoration Project Locations Associated with GIS Coverage (Part III.C.5)
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J. Responsible Person Certification (Part III.E.2.b)
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Appendix B. MDE Letter Approving the Strategy after review.
Appendix C. *MCPS Report to the County on MS4 Activities in FY 2014.*
Appendix D. EPA MS4 inspection Findings and County Response
Appendix E. Implementing_ESD_Report_FINAL_110910.pdf
Zoning Code ESD changes
Appendix F. MDE SW Triennial Review Letter with County Response
Appendix G. *Final Report for IDDE Special Study*
Appendix H. Updated SWP3 Plans for County Facilities, SWPPP Annual Inspections FY13, MDE NOI Acceptance Letters
Appendix I. Lower Monocacy Watershed Implementation Plan
Potomac Direct Watershed Implementation Plan
Patuxent River Watershed Implementation Plan
Seneca Creek Watershed Implementation Plan
Appendix J. Strategy Guidance Document
Appendix K. NPDES Water Chemistry Monitoring in the Breewood Tributary of Upper Sligo Creek, 2009-2013
Breewood Project Fact Sheet
Rationale to Use Breewood tributary for NPDES Required Monitoring
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Appendix M. Montgomery County NPDES 2003 Annual MS4 Report

MONTGOMERY COUNTY MARYLAND
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) DISCHARGE PERMIT

I. Background

The Montgomery County Department of Environmental Protection's (DEP) submission to the Maryland Department of the Environment (MDE) fulfills the annual progress report requirement as specified in Part IV of Permit Number 06-DP-3320 MD0068349 (the Permit). The 5-year Permit term began February 16, 2010, covering stormwater discharges from the MS4 in Montgomery County, Maryland (the County). This is the fifth report in this current permit cycle (February 16, 2010-February 15, 2015) and covers the County's Fiscal Year 2014 (FY14) for July 1, 2013 to June 30, 2014.

The MDE modified the County's second generation Permit effective January 26, 2004 to add six small localities as co-permittees for coverage under the Phase 2 of the NPDES MS4 Permit Program. These included five municipalities: the Towns of Chevy Chase, Kensington, Poolesville, and Somerset, and Chevy Chase Village; and one special tax district, the Village of Friendship Heights. For the third generation Permit, MDE added the Montgomery County Public Schools (MCPS) as a co-permittee.

Significant accomplishments in the County's stormwater management program during FY14 are highlighted in the Overview. The report itself has been organized based on the headings in the Permit's Part III, Standard Permit Conditions, to document implementation of required elements. Information required by the Permit's Attachment A, Annual Report Databases, Parts A. through L. can be found electronically on the compact disc (CD) submission in Appendix A.

The DEP Watershed Management Division (WMD) has primary responsibility for the majority of the Permit requirements, including interagency coordination, annual reporting, source identification, discharge characterization, monitoring, stormwater facility inspection and maintenance, enforcement, illicit discharge detection and elimination, watershed public outreach, watershed assessment and restoration. WMD is also responsible for assessment of stormwater controls, and for tracking progress towards meeting the County's Total Maximum Daily Load (TMDL) urban stormwater wasteload allocations (WLAs) in applicable watersheds. The DEP Division of Solid Waste Services (DSWS) is responsible for all solid waste related programs, including programs to increase awareness of waste reduction and recycling.

The Department of Permitting Services (DPS) is responsible for reviewing and permitting plans for Stormwater Management (SWM) and Erosion and Sediment Control (ESC), and for ensuring plan compliance.. The Department of Transportation (DOT) is responsible for storm drains, road and roadside maintenance. The Department of General Services, (DGS), DEP's DSWS, and DOT are responsible for property maintenance activities at County-owned facilities covered under the NPDES General Permit for Storm Water Discharges Associated with Industrial Facilities.

The Permit required DEP to develop and submit a countywide implementation plan within 1 year of Permit issuance to identify how the County would achieve Permit requirements within the

5-year permit cycle. In February 2011, DEP submitted the draft Montgomery County Coordinated Implementation Strategy (the Strategy) and associated Watershed Implementation Plans to MDE with the FY10 MS4 Annual Report. The Strategy presents the restoration and outreach initiatives that are needed to meet the watershed-specific restoration goals and water quality standards, and is referenced frequently in this report. Specifically, the Strategy provides the planning basis for the County to:

1. Meet Total Maximum Daily Loads (TMDLs) and Wasteload Allocations (WLAs) approved by the U.S. Environmental Protection Agency (EPA).
2. Provide additional stormwater runoff management on impervious acres equal to 20 percent of the impervious area for which runoff is not currently managed to the maximum extent practicable (MEP).
3. Meet commitments in the *Trash Free Potomac Watershed Initiative 2006 Action Agreement* which include support for regional strategies and collaborations aimed at reducing trash, increasing recycling, and increasing education and awareness of trash issues throughout the Potomac Watershed.
4. Educate and involve residents, businesses, and stakeholder groups in achieving measurable water quality improvements.
5. Establish a reporting framework that will be used for annual reporting as required in the County's Permit.
6. Identify necessary organizational infrastructure changes needed to implement the Strategy.

The MDE approved the Strategy in July 2012. The approval letter can be found in the electronic attachment to this report in Appendix B. A final version of the Strategy, and Watershed Implementation Plans, are accessible on DEP's website at:

http://www.montgomerycountymd.gov/DEP/water/county-implementation-strategy.html.

II. Overview

This Overview will summarize County progress in meeting the Permit requirements for FY14, and where possible, over the 5-year Permit term.

Permit Administration

The Permit requires the County to designate an individual to act as liaison with the MDE for Permit implementation. The Permit also requires the County to submit an organizational chart detailing personnel and groups responsible for major NPDES program tasks.

An updated organization chart and contact information is shown in Table III.A.1. These are the contacts as of February 2015.

Legal Authority

The Permit requires the County to maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122 throughout the term of the Permit.

Chapter 19 of the Montgomery County Code- The Stormwater Management Ordinance:

Chapter 19 establishes minimum requirements and procedures to control the adverse impacts associated land disturbance and increased stormwater runoff from developed and developing lands. Chapter 19 includes:

- Article I - Establishes the County's legal authority to administer a Sediment and Erosion Control program
- Article II - Establishes the County's legal authority to administer a Stormwater Management Program
- Article IV - Establishes the County's authority to regulate discharges of pollutants to County streams, and establish inspection and enforcement procedures and penalties for non compliance.

Chapter 19 was modified during the current Permit cycle to add:

Stormwater Management

In July 2010 and March 2011, the County Council passed Bill 40-10 amending the County's stormwater management law to require management of stormwater runoff through the use of nonstructural Best Management Practices (BMPs) to the MEP for new development and redevelopment projects approved by DPS. In response to MDE concerns that a portion of Bill 40-10 was less restrictive than State law, Bill 40-10 was amended in March 2011 as Expedited Bill 7-11 to limit certain alternative SWM measures to redevelopment only. The bills then brought the County's stormwater management law into compliance with the Maryland Stormwater Management Act of 2007 and associated state implementing regulations adopted in 2010.

The revised County stormwater management law maintained more stringent requirements than State law for redevelopment sites to protect water quality. Specifically, the Maryland Stormwater Management Act of 2007 requires management of the first inch of runoff from 50 percent of the redevelopment site using Environmental Site Design (ESD) to the MEP. County law requires stormwater management to protect water quality volume (WQv- the first inch of runoff) and channel protection volume (CPv-the expected runoff from a 1-year 24-hour duration rainfall) from 100 percent of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

Sediment and Erosion Control

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, which brings local erosion and sediment control requirements into compliance with the Maryland Stormwater Management Act of 2007 and the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. The County legislation mirrors the requirements in State law and regulations, including more stringent stabilization requirements and the establishment of maximum grading unit criteria.

Water Quality Protection Charge

In April 2013, the County Council passed Bill 34-12, Stormwater Management-Water Quality Protection Charge (WQPC). Bill 34-12 modified the structure of the County's original WQPC to comply with the 2012 State HB 987, the Stormwater Management- Watershed Protection and Restoration Program Bill.

Coal Tar Sealants

In September 2012, the County Council passed the Coal Tar Pavement Products Law, Bill 21-12, that banned the use of coal tar products, effective December 18, 2012. Under the law, use of a coal-tar based sealant can lead to a fine of up to $1,000—for both the property owner and the applicator.

Other Legislation Enacted During the Current Permit Cycle:

Carryout Bag Law

On January 1, 2012, the County's Carryout Bag Law, Bill 11-8, went into effect. The goal of the law was to increase awareness about the problem with disposable bag litter and to reduce the use of carryout bags. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases out. The Department of Finance is responsible for enforcement of the Bag Law. Restaurants that use paper bags for carryout food do not need to charge the tax.

Source Identification

The Permit requires the County to submit information for all County watersheds in geographic information systems (GIS) format with associated tables.

The County continues to improve its storm drain mapping to facilitate identification of pollution sources from the MS4. The County's storm drain inventory can be found in Appendix A, Part A., on the CD attached to this report.

The DEP's Urban BMP database as of June 30, 2014, with associated coverage is included in Appendix A, Part B. Over the Permit term, DEP made progress towards updating the drainage areas of all stormwater BMPs.

The County's 2009 impervious area associated with GIS coverage, which was used in the Strategy development, is included in Appendix A, Part C. In this Permit cycle, the County evaluated success towards meeting its Permit restoration requirements using the 2009 impervious coverage. In FY14, DEP continued to digitize and update impervious areas for other Permit requirements and for the County's stormwater utility charge, the WQPC, based on 2012 aerial photography.

The DEP's monitoring locations and locations of watershed restoration projects are also included electronically in Appendix A, Parts D. and E.

Discharge Characterization

The Permit requires the County to assess the effectiveness of stormwater management programs, and to document progress towards meeting WLAs included in the TMDLs approved by the EPA.

The DEP conducts monitoring required under this section at the Breewood Tributary within the Anacostia Watershed and in the Clarksburg Town Center drainage within the Seneca Watershed. Detailed results are presented in the report Part III.H titled *'Assessment of Controls'* set forth below.

Management Programs

Stormwater Management (SWM) Facility Maintenance and Inspection

The Permit requires the County to conduct preventative maintenance inspections of all SWM facilities (BMPs) on at least a triennial basis.

The DEP SWM Facility Maintenance and Inspection Program oversees the triennial inspections, structural and non structural maintenance of all SWM BMPs under the County's jurisdiction and assesses repair and maintenance needs. From FY11- FY14, the number of SWM BMPS under County jurisdiction increased from 4,200 to over 8,700. From FY11- FY14, DEP oversaw 4,721 triennial inspections and 7,311 SWM BMPs were maintained by either the DEP structural maintenance program or by the private owner of the facility. DEP also issued over 500 Notice of Violations (NOVs) for correction of deficiencies noted during the triennial inspections. Additionally, DEP sent over 400 routine maintenance notification letters to property owners. DEP also performed a total of 135 unscheduled inspections. These occurred in response to public complaints, at facilities being considered for transfer into DEP's SWM facility maintenance program, or to assess conditions after a large storm event.

During the Permit term, the SWM Facilities Maintenance and Inspection Program developed new protocols to remain in compliance with County and State SWM facility maintenance requirements while remaining fiscally responsible:

- In December 2012, DEP acquired contractual services for routine maintenance of publically owned ESD practices, including Roadway Right-of-Way (ROW), beginning one of the first

environmental site design (ESD) maintenance programs in the Washington metropolitan area.

- In FY15, many of the first permitted and installed ESD facilities will be due for triennial inspections. In FY14, DEP began developing policies and procedures for ESD related inspections, enforcement and administrative processes, and will pilot a residential ESD inspection and maintenance program in FY15-FY16.
- During FY13, DEP developed a protocol to rank maintenance need levels for privately owned and maintained facilities. DEP assigns the maintenance need level using results from the triennial inspections, from those requiring immediate attention (Emergency level) to those with less serious maintenance needs (Routine level). The new protocols ensure that the BMPs with the most serious repair needs are addressed in a timely manner.
- In FY13-FY14, DEP also modified the inspection protocol for public and private underground facilities. Prior to FY13, DEP required that all underground facilities be cleaned once per year. The new inspection protocol requires a pre-cleaning inspection of the facility, in order to determine cleaning need. Facilities deemed acceptable clean and functioning properly and not cleaned until their triennial inspection, allowing facility owners to reduce maintenance costs.

Implementing Maryland's Stormwater Management Act of 2007

The Permit requires the County to implement SWM design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual and provisions of Maryland's Stormwater Management Act of 2007. The Permit requires the County to modify its SWM ordinances, regulations and new development plan approval processes within one year after State adoption of regulations; April 24, 2009, with an effective date of May 4, 2009. The Permit also requires the County to review local codes and ordinances to identify impediments to and opportunities for promoting ESD to the MEP within one year, and to remove those impediments within two years of the Permit's issuance.

As described under the section "Legal Authority", in July 2010 and March 2011, the County Council passed Bill 40-10 amending the County's stormwater management law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. The bills then brought the County's stormwater management law into compliance with the Maryland Stormwater Management Act of 2007 and associated state implementing regulations adopted in 2010.

In 2010, the County summarized how the County's codes, regulations, programs, and policies may need to be updated to allow the use of ESD techniques to the MEP in the report, *Implementing Environmental Site Design in Montgomery County*. The most significant updates required were accomplished through the Zoning Code rewrite, completed by the Planning Department of the Maryland-National Capital Park and Planning Commission (M-NCPPC). The zoning code rewrite, Zoning Text Amendment (ZTA) 13-04 was approved by Council March 5, 2014, and took effect October 30, 2014.

The DPS has been working with its fellow agencies and some members of the SWM construction community through the Policy and Design Committee and the New Products Committee on design and maintenance aspects of various ESD practices. The goal is to assure that these practices provide cost-effective designs that provide maximum runoff reduction and

pollutant removal without increasing average maintenance cost per facility. This is critical since the decentralized nature of the ESD approach results in many more structures per site that must be inspected to assure aesthetic (i.e. trash and invasive plant removal) as well as continued function.

The DEP also continues outreach on ESD practices to increase community acceptance of these practices and future stewardship for routine housekeeping of the roadside ESD practices. Watershed groups, such as the Audubon Naturalist Society (ANS) and the Friends of Sligo Creek (FoSC) have provided assistance to DEP outreach efforts, both for the "Green Streets" pilot (a DEP/DOT partnership where ESD practices are installed in the roadway right of way) and also for residential properties retrofits through DEP's RainScapes Neighborhoods program. DEP also has developed numerous fact sheets designed to provide assistance to residents in maintenance of their ESD practices.

MDE's Triennial Stormwater Program Review

The Permit requires the County to maintain programmatic and implementation information according to the requirements established as part of MDE's triennial stormwater program review.

In April 2013, MDE completed a review of the County's stormwater management program, evaluating the status of implementing ESD to the MEP in the County's plan review and approval process. MDE found the County's program to be acceptable under State law and in compliance with Part III.E.1 of the Permit.

Erosion and Sediment Control (ESC)

The Permit requires the County to maintain an acceptable ESC program, including implementing program improvements identified in any MDE evaluation of the County's application for the delegation of ESC enforcement authority, conduct responsible personnel certification classes and report quarterly information on earth disturbances exceeding one acre or more.

Table II.1, below, summarizes the Erosion and Sediment Control Inspection and Enforcement Program over the Permit term.

Table II.1. County Erosion and Sediment Control Program Enforcement Action Summary

	FY11	FY12	FY13	FY14	Total
Inspections	13,472	11,191	12,439	18,151	55,253
NOVs	343	248	235	520	1,346
Citations	146	105	103	160	514
Fines Collected	$43,926	$55,750	$67,000	$82,350	$249,027

The DPS continues to conduct "responsible personnel certification training" three times a year as required by the Permit. In FY14, however, MDE developed an online class to certify responsible personnel in erosion and sediment control, which will constitute the County's responsible

certification and comply with the County's Permit conditions. DPS also continues to report to MDE quarterly information on earth disturbances exceeding 1 acre or more.

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, which brings local erosion and sediment control requirements into compliance with the Maryland Stormwater Management Act of 2007 and the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control.

The MDE performed a biennial evaluation of the County's ESC program as part of their review of the County's application for the delegation of ESC enforcement authority in November of 2013. Continued delegation was granted by Brian Clevenger, Program Manager of MDE's Sediment, Stormwater and Dam Safety Program in a letter dated January 6, 2014. In that letter, MDE stated that it "has also determined that the County's program is in compliance with the erosion and sediment control program elements stipulated in Part III.E.2 of the Montgomery County MS4 Permit".

Illicit Discharge Detection and Elimination (IDDE)

The Permit requires the County to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 system that are not composed entirely of stormwater are either permitted by MDE or eliminated. The Permit requires the County to field screen 150 outfalls annually, conduct routine surveys of commercial and industrial areas, and maintain an enforcement program to address discharges, dumping and spills.

In previous Permits, DEP conducted outfall surveys in areas where the County's monitoring program found biological impairments not related to physical habitat degradation. DEP then used the County's storm drain layer to identify outfalls in those areas for investigation. Evaluation of that method found that it did not effectively identify illicit discharges. For example, from 2007-2009, 231 outfalls were screened, but only six outfalls (2.5 percent) were found with dry weather discharges that exceeded the detection levels of the Permit required field chemical tests.

In FY11, DEP partnered with the Center for Watershed Protection (CWP) to perform a pilot IDDE investigation of the Sligo Creek subwatershed of the Anacostia following protocols in the CWP's *Illicit Discharge Detection and Elimination Manual*. The CWP protocol added two elements that greatly improved the efficiency of the investigations. The team physically walked the entire reach of the targeted waterbody, allowing comprehensive evaluation of the frequency of problems, and provided information that will improve the accuracy of the County's storm drain GIS layer. The protocol also added additional field test parameters, notably ammonia, potassium, and fluoride, which provided more information on possible sources of the discharges and increased the likelihood of source identification and elimination.

In FY14, DEP performed outfall screening in the Little Falls watershed. DEP screened 154 outfalls and found 66 with dry weather flow. DEP performed field testing for permit required water chemistry parameters and also for ammonia, potassium and fluoride. Nineteen outfalls had elevated parameters, and follow up investigations were performed. Of those 19 outfalls, 16 were found to have normal water chemistry parameters during follow up visits. Table II.2 shows the problems identified at the remaining outfalls.

Table II.2. Investigation Results of Suspected Illicit Discharges During FY14			
Outfall ID	Location	Problem Found	Resolution
GM562P0600	Shops at Sumner Pl.	Sewage Discharge from private facility	Property Management working to correct
HN121P0329	Arlington Road	Suspected Sewage Discharge	Continuing to investigate source
HM343P0106	Willard Ave.	Wastewater cross-connection to storm drain	NOV issued and problem corrected
HM343P0106	Willard Ave.	Discharge from parking garage cleaning	Required change to cleaning procedures

Table II.3, below, summarizes DEP's IDDE program during the Permit term. From FY11-FY14, DEP assessed 716 outfalls by walking the entire reach of waterbodies in four separate subwatersheds, capturing most of the existing outfalls in each drainage area. DEP is targeting subwatersheds with the highest percentages of commercial and industrial areas to identify and eliminate pollutant sources in those areas.

Table II.3. Illicit Discharge Detection and Elimination Summary, FY11-FY14		
		% of Total
Outfalls Screened	716	
Outfalls Unmapped	518	72% of Total Outfalls Screened
Suspected Illicit Discharges	96	13% of Total Outfalls Screened
Resulting Investigations	74	10% of Total Outfalls Screened
Problem Resolved	13	1.8% Of Total Outfalls Screened

CCTV Inspections in FY14

Tracking illicit discharges in heavily urban areas is problematic for a number of reasons. Tracking the discharge above ground by looking into up gradient manholes is often not successful due to missing storm drain information, very complex storm drain systems, paved over manholes, or intermittent flow. In FY14, DEP has obtained contractual support to conduct closed circuit television (CCTV) investigations into the remaining unidentified discharges. Results included:

– Wayne Avenue Discharge - CCTV inspection determined that a dry weather discharge originated from an underground SWM management facility behind a shopping center. The SWM facility received runoff from a loading dock and dumpster area behind a grocery store. DEP worked with the shopping center property owner to clean the underground SWM facility and repair any leaking dumpsters.

– Maple Avenue Discharge - CCTV inspection identified several small flows originating from apartment building heating, ventilation and air conditioning (HVAC) units. A subsequent inspection of the Maple Avenue outfall also identified flow coming from a large underground SWM facility. Other investigations of smaller flows revealed a clogged storm drain referred to DOT for repair.

HVAC Discharge Pilot Study

For FY14, DEP worked with the CWP under contract to further study and quantify the extent of pollution from anti-microbial agents used in rooftop HVAC systems. During previous year investigations in the Sligo Creek subwatershed, high ammonia discharges in two drainage areas were traced to commercial sites, and were found to originate from air conditioner condensate. Limited sampling conducted by CWP suggests pollution loading for nitrogen, copper and zinc, but specific management measures and products that contribute to the problem are still unknown.

The study focused on the Sligo Creek subwatershed. Field crews found 33 suspected HVAC discharges, all with elevated levels of ammonia, and metals. Investigations were conducted at nine sites, five of which had cooling towers. Building managers generally did not know whether condensate or cooling tower water drained to the storm drain or sanitary system. All managers reported that their systems received regular service by an external contractor. Condenser coils were generally cleaned on an annual or semi-annual frequency either by vacuum or high-pressure water jet and sometimes with ammonia-based anti-microbial products. Biocide products were also used in A/C drip pans at several sites to control the growth of algae, mold, and fungi and to eliminate odors and pan corrosion.

Rooftop inspections confirmed HVAC discharges to the storm drain at two locations. One additional inspection determined that the discharge was not associated with an HVAC system but was actually tied to a first-floor refrigeration unit at a restaurant. Two other inspections were inconclusive.

The County Water Quality Ordinance (Chapter 19, Article IV) prohibits anything other than clean water from being discharged to the MS4 system, and would apply to HVAC discharges. The cooling tower discharges should be connected to the sanitary system, but WSSC does not currently accept HVAC condensate discharges. MDE should address HVAC discharge pollution at a statewide-scale since it is unlikely that this source is limited to only Montgomery County. If condensate cannot be directed to WSSC, the following strategies should be undertaken:

1. Work with property owners to eliminate the use of biocides in A/C drip pans and condenser coils. A/C drip pans can be cleaned regularly with mild soap and water.
2. Encourage property owners to clean condenser coils monthly or quarterly, preferably by vacuum or other dry methods or with mild detergent solution if needed.
3. Drain condensate lines to landscaped areas and not the street or storm drain system. On-site treatment options can be explored with MDE.
4. Re-use condensate, where possible, in subsurface irrigation systems or in cooling towers.

Enforcement Actions

DEP's Division of Environmental Policy and Compliance (DEPC) implements a highly effective environmental enforcement group that has great success in eliminating discharges reported by

the public. Over the Permit term, the group has responded to 774 water quality related complaints, which led to 149 enforcement actions.

Most complaints are reported to DEP through the County's call center for non-emergency services (311), or through the DEP website.

DEPC also investigates illegal dumping complaints. Details on the enforcement actions over the Permit term are summarized in Table II.4.

Table II.4. Summary of Enforcement Actions, FY11-FY14

	FY11	FY12	FY13	FY14	Total
Water Quality Investigations	122	208	206	238	774
NOV	16	17	14	28	75
Citations	18	14	11	6	49
Fines Collected	$9,000	$7,000	$6,000	$3,000	$25,000
Illegal Dumping Cases	471	450	377	354	1,652
NOVs	34	36	16	18	104
Citations	7	11	0	2	20
Fines	$3,500	$5,500	0	$1,000	$10,000

DEP is also partnering with community groups for faster response when a pollution discharge is reported. In January 2012, the DEPC established an e-mail process for Friends of Sligo Creek (FoSC) members to report water quality incidents directly to DEPC staff. Subsequently, two residents formed a neighborhood group, Water WatchDogs to work with DEP and the FoSC to enhance reporting and facilitate follow up for pollution incidents. Members are trained to provide specific information that is transmitted via email straight to DEP field enforcement staff. In FY13, volunteers reported 13 incidents covering a wide range of water pollution problems, resulting in five investigations with one enforcement action.

Trash and Litter

The Permit requires the County to meet its obligations under the Potomac River Watershed Trash Treaty, including trash abatement program implementation, education, and evaluation.

The Strategy includes trash reduction work plans designed to meet the Potomac Trash Free Treaty goals and the MS4 wasteload allocations for the 2010 Anacostia Trash TMDL. The County is also working with the Anacostia Watershed Restoration Partnership, the Alice Ferguson Foundation, and other partners to meet regional trash reduction goals. Initiatives directly related to the regional campaign include ongoing education and outreach for recycling and litter reduction, mass media outreach campaigns, and litter removal from streets, stormwater ponds, and transit stops.

On January 1, 2012, the County's Carryout Bag Law, Bill 11-8, went into effect. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain retail establishments to carry purchases out. From the implementation to June 2014, over 146 million bags were sold in Montgomery County. In FY14, approximately 60 million carryout bags were

sold. This represents an average of a little less than five disposable bags bought per county resident each month. In the first month of FY14, the County had 1,108 registered retailers remitting the bag tax collected from their business. As of June 2014, there are 1,185 registered retailers in the system. Bag law data analysis to date suggest a slight downward trend, however DEP does not have enough data to definitively report a change in bag usage for the County.

The DEP continues via contract to conduct trash monitoring and assessment in the Anacostia Watershed. The litter survey and evaluation for instream trash structures in Rock Creek was completed in 2012. FY14 highlights include:

- Completed four cycles of post-TMDL trash monitoring in the Anacostia. The Anacostia tributary monitoring follows the same protocols for stream-level and land-based surveys as those used for trash TMDL development. As of FY14, there is a general decreasing trend for plastic bag, plastic bottle and Styrofoam trash categories.
- Began three additional types of observation surveys within the White Oak neighborhood of Silver Spring (Anacostia watershed) since monitoring results have shown this area to have the highest amounts of litter found in the stream; a bus stop survey, walking survey, and storm drain inlet survey. This data will be used to help analyze and implement future litter control projects that may be tested for effectiveness in this neighborhood and potentially replicated in new areas.

Property Management

The Permit requires the County to ensure that a Notice of Intent (NOI) has been submitted to MDE, and a pollution prevention plan developed, for each County owned and municipal facility requiring a NPDES General Permit for Stormwater Associated with Industrial Activities.

Table II.5 lists the County facilities covered under the MDE General Discharge Permit for Storm Water Associated with Industrial Activities (the General Permit). The MDE accepted Notices of Intent (NOI's) for these facilities in August 2014 for coverage until December 31, 2018.

Table II.5. County Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities

Name of Facility / Responsible Agency	Watershed / Acreage
Colesville Highway Maintenance Depot (DOT)	Anacostia/Paint Branch; 12 acres
Damascus Highway Maintenance Depot (DOT)	Potomac/Great Seneca: 1.4 acres
Gaithersburg: Highway Maintenance Facility (DOT)	Potomac/Rock Creek: 15.1 acres
Gaithersburg: Equipment Maintenance and Transit Operations Center (EMTOC) (DGS)	
Poolesville Highway Maintenance Facility (DOT)	Potomac/Dry Seneca Creek: 4 Acres
Bethesda/Seven Locks Automotive Service Center (DGS)	Potomac/Cabin John Creek: 19 Acres
Bethesda/Seven Locks Highway Maintenance Facility, Sign Shop and Signal Shop (DGS)	
Kensington Small Transit Service Maintenance Facility at Nicholson Court	Potomac/Rock Creek: 3.31 acres

Table II.5. County Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities	
Name of Facility / Responsible Agency	Watershed / Acreage
Silver Spring/Brookville Road Highway Maintenance Facility (DOT)	Potomac/Rock Creek: 18 Acres
Silver Spring/Brookville Road Transit Center/ Fleet Maintenance Center (DGS)	
Shady Grove Processing Facility (DEP)	Potomac/Rock Creek; 43 out of 52.5 acres
Gude Landfill (DEP)	Potomac/Rock Creek; 120 acres
Oaks Landfill (DEP)	Patuxent/Hawlings River (355 acres) and Potomac/Rock Creek;(190 acres)

In 2008, new Capital Improvement Program (CIP) funding dedicated to environmental compliance was added to the DGS budget. In 2014, the following environmental compliance CIP initiatives were accomplished:

- As part of the County's Smart Growth Initiative, the Gaithersburg Heavy Equipment Maintenance and Operations Center, Transit Services and Highway Maintenance facility were relocated to the County's Equipment Maintenance and Transit Operations Center (EMTOC). The onsite facilities include many pollution prevention and stormwater management upgrades including a green roof, new bus wash facility, heavy equipment storage shed, soil/gravel storage area, salt barns, and Highway Services bays.
- Spill Prevention Control and Countermeasure (SPCC) Plans were developed for the new County facilities.
- Stormwater Pollution Prevention Plans (SWPPP) were developed for all County facilities covered under the General Permit.
- The DGS removed underground storage tanks (USTS) and contaminated soils from the old location of the Gaithersburg Heavy Equipment Maintenance and Operations Center.
- DGS is also currently replacing USTs with aboveground storage tanks at County Fire Stations.
- Construction of the Silver Spring /Brookville Road Depot stormwater improvements continues, which will add two Baysaver water quality structures, and trench drains to improve the water quality from the transit maintenance facility area. Planned improvements for FY15 include a new permanent structure for bulk storage of highway maintenance materials (topsoil, sand, gravel), and an improved bus stream bay.
- Upgraded oil handling area at the Brookville Depot.
- DGS/DOT has begun routine mechanical sweeping of all the industrial facilities, and increasing the cleaning frequency of facility oil/grit separators. In FY14, all depots were swept.

The MCPS conducted pollution prevention (P2) training for staff, prepared and implemented SWPPP and SPCC plans at all industrial sites. P2 improvements have been implemented at these

sites as recommended by the annual inspections. MCPS also continued to implement an Integrated Pest Management Program (IPM) program at all facilities. Table II.6 lists the MCPS facilities covered under the MDE General Discharge Permit for Storm Water Associated with Industrial Activities (the General Permit).

Table II.6. Inventory and Status of MCPS Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities (12-SW)

Name of Facility / Responsible Agency	Watershed / Acreage	Status
Bethesda Fleet Maintenance / Bethesda Facilities Maintenance Depot	Cabin John Creek 6.2 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Randolph Fleet Maintenance / Randolph Facilities Maintenance	Anacostia 9.3 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Shady Grove Fleet Maintenance / Shady Grove Facilities Maintenance	Rock Creek 15 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
West Farm Transportation Depot	Anacostia River 5.06 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Clarksburg Fleet Maintenance/Clarksburg Facilities	Seneca Creek 15.11 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.

Road Maintenance

The Permit requires the County to continue to implement a program to reduce pollutants associated with road maintenance activities.

Street Sweeping

In FY14, the County continued its street sweeping program, focusing on twice monthly sweeping of 229 miles in selected arterial routes, removing 406.4 tons of material. The sweeping frequency provides equivalents for impervious acreage control and pollutant reduction credit as specified in the MDE's August 2014 "*Accounting for Stormwater Wasteload Allocations and Impervious Acreage Treated*" guidance document. For FY14, the County controlled an impervious acreage equivalent of 162.6 acres and reduced 1421 pounds of Total Nitrogen (TN) and 568 pounds of Total Phosphorous (TP).

The DOT completed annual sweeping for all residential routes. In FY14, DOT swept a total of 4,055 residential curb miles, removing 981 tons of material. However, MDE does not provide for impervious acre credit for once only frequency street sweeping.

Inlet Cleaning

For FY14, DOT reported cleaning 648 storm drain inlets, and 20,710 linear feet of storm drain, collecting 217 tons of material.

Use of Herbicides

The County's roadside noxious weed spraying program is conducted by Montgomery Weed Control Inc., a cooperative weed control program between Montgomery County Department of Economic Development, Agricultural Services Division, and the Maryland Department of Agriculture, Plant Protection and Weed Management Section. The County uses no other pesticides or any fertilizers for roadside vegetation management.

Application of Sand and Salt

The DOT reported applying 111,787 tons of salt and 121,787 gallons of salt brine to County roadways during December through March of FY14. In 2009, DOT had begun a salt brine pilot program on 240 lane miles of primary roads. Salt brine is a 23 percent salt solution created in a brine maker that has a lower freezing point than salt. In FY14, over 2,034 lane miles of both primary and secondary roads received salt brine applications using contracted and County equipment.

Public Education and Outreach

The Permit requires the County to implement a public education and outreach program to reduce stormwater pollutants.

Over the Permit term, DEP continued to expand its education and outreach programs to meet Permit requirements as outlined in the Strategy public outreach and stewardship work plan (POSWP). The POSWP identified eight major areas of stormwater impact education, including pet waste management, lawn stewardship, anti-littering, stormwater awareness, and establishing a volunteer Stream Stewards program. Over the Permit term, DEP has participated in 309 events focused on stormwater awareness, representing direct contact with an estimated 33,000 residents. The RainScapes program hosted an additional 120 workshops on small scale stormwater practices for homeowners and landscape professionals, reaching an additional 4,300 residents.

The DEP tracks details on watershed outreach events, and has included event information in the Permit required Annual Report Database, Part D, found electronically in Appendix A. The goal for the DEP program is to eventually quantify pollutant reductions associated with behavior changes from its education and outreach programs.

Summary of Stormwater Outreach Efforts During the Permit Term

The DEP expanded its outreach and stewardship during this fiscal year and throughout the permit cycle. Outreach and stewardship highlights include:

- Creating a public outreach and stewardship plan in 2010
- Hiring three watershed outreach staff
- General watershed outreach activities increased 745 percent from FY10-FY14
- Overhauling the DEP website to better suit the needs of the public
- Creating a "My Green Montgomery" website as a public interactive website to promote green initiatives and activities.

- Creating additional Outreach programs, including:
  - The Stream Stewards Volunteer Outreach Program
  - A Pet Waste Management Program with homeowners associations
  - A Storm Drain Art Program
  - The Montgomery County FrogWatch USA chapter
  - The H2O Summit annual community event
  - The "Caching the Rain" stormwater awareness geotrail
  - The Watershed Management Grant Program
- Focused outreach to culturally diverse communities increased, including translations for 22 publications.
- Forty-three new outreach publications were created.
- Achieving a social media presence by creating DEP Facebook, Twitter, Instagram, Flickr and blog accounts including five group listserves and e-newsletters.
- Creating a watershed group capacity building effort which helped eight watershed groups build a stronger organizational structure.
- Two new watershed groups were created since FY10: Muddy Branch Alliance and the Watts Branch Alliance.
- The Water WatchDogs group, started by the Friends of Sligo Creek watershed group as a means to raise public awareness on water pollution and enhance an email alert mechanism for reporting pollution incidents.

Watershed Assessment

The Permit requires the County to conduct a systematic assessment of water quality within all of its watersheds, including identification of water quality improvement opportunities, and the development and implementation of plans to control stormwater discharges to the MEP.

Watershed Implementation Plans

In FY14, DEP completed assessments of the Lower Monocacy, Patuxent River, Upper and Lower Potomac Direct, Dry Seneca and Little Seneca watersheds. These assessments include identification of ESD opportunities, stormwater pond retrofits, new stormwater control opportunities, and potential stream restoration. Watershed implementation plans, which present more detailed implementation planning and schedules to meet regulatory and programmatic targets, were completed in early FY15.

Stream Monitoring

The County conducts biological monitoring for fish and benthic macroinvertebrates (aquatic insects) on a calender year basis. In 2013, DEP monitored the Great Seneca Creek watershed. A total of 30 stations were monitored. The results for the Great Seneca watershed have remained fairly consistent for the 1998, 2001, 2006 and 2013 monitoring cycles. Fourteen stations (48 percent) had the same category designation in 2013 as they had in 1997/1998. Eight stations

(28 percent) were not monitored in the 1997/8 and/or 2013, three stations improved categories and four stations decreased categories.

From 2010 through 2013, 117 baseline stations and 20 Special Protection Area (SPA) stations have been monitored to provide assessment of water quality. When compared to the earlier results, 36 sites had an increase in rating category, 21 had a decrease while 72 did not change categories in this monitoring cycle (2010-2013). Six stations had incomplete data sets for the current monitoring period, generally fishing results. Results have predominantly remained unchanged or increased slightly since the first monitoring cycle. Sligo Creek has been the focus of restoration since the mid 1980's however substantial change in IBI scores have yet to be realized. All Sligo Creek sites with long-term monitoring have remained in the poor category. However restorations efforts in Lower Rock Creek, specifically Joseph's Branch, have seen slight improvements in the biology. Restoration efforts have affected fish habitat the most. Fish results have increased at a faster rate than the benthic macroinvertebrate communities. The urbanized location may limit noticeable improvements to the benthos.

Watershed Restoration

The Permit requires the County to implement practices identified in its watershed assessments to control stormwater discharges to the MEP. The Permit specifically requires the County to complete the implementation of restoration projects identified in the previous Permit term to restore 10% of the County's impervious surface area. The permit also requires the County to complete the implementation of restoration to restore an additional 20% of the County's impervious surface area that is not restored to the MEP.

The Strategy provides the planning basis to meet the Permit's restoration goal. DEP developed the Strategy using 2009 data, including impervious area and BMP drainage areas. DEP notes that the Strategy was developed prior to MDE guidance for accounting for stormwater wasteload allocations and impervious acres treated.

Several developments over the Permit term now allow more accurate impervious area control accounting. DEP updated the County impervious area GIS coverage, and the urban BMP database, adding over 1,000 new BMPs. DEP made progress digitizing and refining the BMP's drainage areas. MDE also published "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*" (MDE Guidance Document) in August 2014. DEP is currently using the new information to re-analyze the Permit baseline of uncontrolled impervious area, the impervious area controlled to the MEP in 2009, and the control achieved through implementation of restoration projects during the Permit term. DEP expects that re-analysis will show that fewer impervious acres were uncontrolled in the 2009 baseline year. Since the Permit requires the County to restore 20% of its uncontrolled impervious, the County's impervious restoration goal is also expected to be reduced.

Because DEP's annual MS4 Permit reports are based on fiscal year, this report only covers the County's progress towards meeting its Permit requirements through June 30, 2014 (FY14). DEP will submit a final report documenting County progress towards meeting watershed restoration requirements through the end of the Permit term (February 16, 2015) in June 2015. The final Watershed Restoration report will present the results of DEP's comprehensive re-analysis of County controlled and uncontrolled impervious area, and area treated by restoration projects.

County progress towards meeting all other Permit requirements in FY15 will be reported in the FY15 MS4 Annual Report.

Achieving the 2001 MS4 Permit Watershed Restoration Goal

The County's second generation Permit issued in 2001 required the County to restore a watershed or combination of watersheds equal to 10 percent of County impervious area not treated to the MEP. Using data developed for the Strategy, DEP calculated the 10 percent watershed restoration goal to be 2,146 acres. In FY11, the County reported that SWM BMP CIP projects completed through FY10 achieved control of 1,091 impervious acres. Based on the MDE draft guidance published in June 2011, DEP also calculated that 20 miles of completed stream restoration added the remaining equivalent impervious acreage treatment of 1,055 acres. Thus the total reported impervious control added through CIP watershed restoration projects was 2,146 impervious acres, meeting the 10 percent watershed restoration requirement.

Progress Towards Meeting the 2010 MS4 Permit Watershed Restoration Goal

The DEP has an aggressive watershed restoration program to meet the current Permit's requirement to add control to 20 percent of the impervious areas not currently controlled to the MEP (3,976 impervious acres):

- Projects completed through FY14 have added control to 1,030 impervious acres.
- Projects under construction during FY14 will treat an additional 130 uncontrolled impervious acres.
- In FY14, DEP released task orders to DEP's water resources engineering consultants that facilitate the design of watershed restoration projects to control an additional 2,386 acres of uncontrolled impervious area.
- Task Orders will be issued in FY15 to for projects that will add stormwater control to 220 additional impervious acres.
- The remaining 210 acres will be controlled through partnership projects currently in design and under construction with other County and external agencies. These projects include facility modification and modernizations performed by DOT, DGS, and MCPS, and WSSC's stream restoration activities during their asset modernization. They also include the Maryland State Highway Administration's (SHA's) Inter County Connector (ICC) stewardship partnership projects. More detail about these future partnership projects will be provided in the final Watershed Restoration report.

Meeting Wasteload Allocations in Watersheds with EPA approved Total Maximum Daily Loads

The Permit requires the County to report progress toward meeting any applicable WLAs developed under EPA approved TMDLs in watersheds where restoration has occurred.

The Strategy used the Watershed Treatment Model (WTM) to verify pollutant baseline loads in TMDL watersheds, and estimate pollutant load reductions by SWM BMPs and retrofits constructed after TMDL baseline years. DEP then added nutrients and sediment reductions from stream restoration projects using efficiencies provided in MDE's June 2011 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. The County stormwater

control and watershed restoration initiatives implemented after the TMDL baselines for County watersheds have made progress towards meeting watersheds WLAs by removing an estimated 115 billion MPN/year of E.coli, 29,745 billion MPN/year Enterococci, 15,708 tons/year of sediment, 15,292 pounds/year of nitrogen, 9,483 pounds/year of phosphorus, and 8,229 pounds/year of trash from the watersheds with WLAs. Since 2010, the baseline year of the Chesapeake Bay TMDL, an estimated 7,264 pounds of nitrogen, and 2,566 pounds of phosphorous have been removed from Countywide stormwater runoff.

RainScapes Program

The DEP's RainScapes program promotes and implements environmentally friendly landscaping, small scale stormwater control and infiltration projects on residential, institutional, and commercial properties. DEP offers technical and financial assistance to property owners for eligible RainScapes techniques, such as rain gardens, tree planting, rain barrels, and conservation landscaping. The RainScapes program consists of RainScapes Rewards, a rebate program, and the RainScapes Neighborhoods, which evaluates targeted neighborhoods for County installed on-lot stormwater runoff reduction approaches. To date in FY14, over 14 impervious acres are being controlled through RainScapes projects for at least the first inch of rainfall, with many projects controlled up to the 1-year storm event.

Restoration Funding Sources

During FY14, DEP continued to identify funding sources to support project implementation. The 6-year SWM CIP budget for FY15-FY20 reflects the significant increase in implementation that will be needed to meet the Permit requirement to control 20% of the County's uncontrolled impervious area. As shown in Tables III.G.11 and III.G.12, the approved budget for FY15 is $53,345,000 compared to $35,000,000 for FY14 and $25,000,000 for FY13.

The approved FY15-FY20 SWM Program totals $363.7 million, an increase of $128.7 million, or 55 percent from the amended approved FY13-FY18 program of $235 million. This increase in stormwater management activity will be financed primarily through water quality protection bonds. The debt service for these bonds will be supported by the County's WQPF. The budget assumes $60 million in State aid over the 6 year CIP cycle, based on past grants received.. The RainScapes Program is also funded through the WQPF but not as a CIP category.

Assessment of Controls

The Permit requires that the County use discharge characterization monitoring, along with biological and physical monitoring to assess "the effectiveness of stormwater management programs, County watershed restoration projects, and to document progress towards meeting wasteload allocations (WLAs) indicated in the Total Maximum Daily Loads (TMDLs) approved by the U.S. Environmental Protection Agency (EPA) for watersheds or stream segments located in the County". The Permit specifically requires monitoring where the cumulative effects of watershed restoration activities (the Breewood Tributary) and the effectiveness of stormwater management practices for stream channel protection (Clarksburg Special Protection Area) can be assessed.

Watershed Restoration Assessment

The DEP targeted the Breewood tributary of Sligo Creek (Anacostia watershed) for comprehensive watershed restoration efforts and assessment of controls. The Permit requires water chemistry, biological and physical monitoring of the watershed, both pre and post restoration. In FY14, the restoration had not been fully implemented, and monitoring reflects pre-restoration conditions. No conclusions can be made yet about the restoration effectiveness.

During 2013, DEP continued pre-restoration water chemistry monitoring. Water samples were collected at an instream station and a stormwater outfall station for a total of 41 storms and 55 baseflow events monitored from 2009 through 2013. For each station, baseflow mean concentrations (MC) were calculated for all Permit required parameters over the 3-year monitoring period. MCs were also calculated for total petroleum hydrocarbons (TPH) and Enterococcus during first flush stormflow.

Storm event mean concentrations (EMCs) represent the weighted average pollutant concentrations based on samples collected at discrete intervals during a storm. EMCs were calculated and averaged over the three-year monitoring period for each parameter except TPH and Enterococcus. The average EMCs and MCs of each parameter at each station were compared:

- Storm samples generally had more concentrated pollutants at the outfall than at the instream station.
- At the instream station, there was not a consistent relationship between flow types and results.
- At the outfall, no clear trends in pollutant concentrations by flow type were found.

The 2010 thru 2013 biological and physical monitoring results provide evidence that the Breewood tributary is impaired and will likely benefit from stream restoration. Monitoring will continue annually to evaluate improvements to the biology and habitat that are anticipated as a result of the restoration efforts.

Stormwater Management Assessment

Maryland Design Manual Monitoring in Clarksburg

The DEP submitted 2013 monitoring results for the developing Newcut Road Neighborhood tributary to Little Seneca Creek "test" area in the Clarksburg SPA as compared to results from the undeveloped Sopers Branch, Little Bennett subwatershed "control" area to evaluate the effectiveness of the Maryland Design Manual criteria to protect the stream channel. Development in the test area's drainage is mostly complete, and ESC BMPs are being converted to SWM BMPs. There is a small portion of the test area at the downstream end that was undergoing new construction in 2013. DEP expects all the BMPs to be converted to SWM BMPs in 2014. The land uses in the Soper's Branch control area remained unchanged.

The natural hydrology of the test area has been altered dramatically by the development process. On average, the overall amount of precipitation infiltrating into the ground or lost via evapotransporation has steadily declined in the test area while remaining fairly constant in the control area. The construction phase of development has impacted the test area channel morphology due to channel straightening, down-cutting, and enlargement. DEP will continue to

evaluate the ability of SWM BMPs to mimic pre-construction hydrologic conditions as the construction process is completed and the SWM BMPs are on-line.

Program Funding

The Permit requires that the County submit annual expenditures for the capital, operation, and maintenance expenditures in database format specified in Permit Part IV.

The required database is included in electronic format on CD in Attachment A. During FY14, the reported costs associated with Permit requirements were $51,728,358.

Total Maximum Daily Loads

The Permit requires development of implementation plans showing how the County will meet the MS4 WLAs for any EPA approved TMDLs within one year of EPA approval.

The County Strategy addressed all existing TMDLs in September 2009, the baseline for the Strategy. Since the baseline date, EPA has approved additional TMDLs, which are shown in Table II.7 below, with the status of their implementation plans. The plans are included in the electronic attachment to this report in Appendix I.

Table II.7. TMDLs Approved Since 2009

Watershed	TMDL	Status of Implementation Plan
Anacostia	PCB	Implementation Plan Submitted in 2013
Cabin John Creek	Sediment	Required Reductions Shown in Strategy
Lower Monocacy	Bacteria	Implementation Plan Complete 2014
Lower Monocacy	Phosphorous	Implementation Plan Complete 2014
Potomac River Direct	Sediment	Implementation Plan Complete 2014
Rock Creek	Sediment	Required Reductions Shown in Strategy
Rock Creek	Phosphorous	Required Reductions Shown in Strategy
Seneca Creek	Sediment	Implementation Plan Complete 2014

Special Programmatic Conditions

Tributary Strategy

The DEP continued to serve as the local liaison for activities related to Maryland's Watershed Implementation Plan (WIP) process. In July 2014, the MDE published the results of its evaluation of local programs in meeting 2012-2013 Milestones. The County received 'High' ratings for most of these categories including resource enhancements, legal authority, organizational enhancements, and planning/studies. The County's stormwater sector received 'High' ratings in every category. The County received a "Medium" rating in the review category "addresses appropriate sectors (comprehensiveness)" because there were no milestones developed for pollution reduction from the septic sector. The County plans to develop

milestones in the septic sector in the future. The complete evaluation is available on the MDE web site:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/Milestones/2012-2013/Local/Evaluations/Local_2013_Milestone_Summary_Evaluations.pdf

There were no local meetings held during FY14 related to the WIP efforts. However, the DEP continued to coordinate with the four Phase 2 MS4 Permit localities as MDE moved forward with the next phase in the Maryland WIP process. This included participating in the WIP regional meetings held by MDE in April and November of 2013 and coordinating submission in January 2014 for Phase 2 milestones and local progress. Implementation remains on track as proposed in the WIP Phase 2 document submitted to MDE in November 2011.

Comprehensive Planning

The County agencies are routine participants for review and comment as MNCPPC Sector Plan and Master Plan documents are being developed. During FY14, the DEP provided data and analysis of local stream conditions for use in the Bethesda Sector Plan and will continue to participate in the development of the Bethesda EcoDistrict being envisioned. The DEP along with DPS was a lead local agency for technical and policy support during the 2012-2014 process for the Ten Mile Creek area Limited Amendment to the Clarksburg Master Plan and Hyattstown Special Study Area. This process included a watershed-based approach to evaluating existing water quality and potential development impacts to those receiving streams. The County Council took the step of establishing the entire Ten Mile Creek watershed as a Special Protection Area in addition to the protective zoning recommendations from the Planning Board.

III. Standard Permit Conditions

A. Permit Administration

Table III.A.1, below, shows County personnel responsible for major NPDES program tasks. These are the County's contacts as of February 2015.

Table III.A.1. Organization Chart for Montgomery County Permit-Required Programs				
Part III. Standard Permit Elements	Responsible Party			
	Department	Name	Title	Telephone
A. Organization Chart-Liaison with MDE for Permit Implementation	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
B. Legal Authority	OCA	Walter Wilson	Associate County Attorney	240-777-6759
C. Source Identification				
1. Storm Drain GIS	DEP/WMD	Craig Carson	Manager	240-777-7709
	DEP/DO	Vicky Wan	IT Manager	240-777-7722
2. Urban Best Management Practices GIS	DEP/WMD	Amy Stevens	Manager	240-777-7766
3. Impervious Surfaces GIS	DEP/DO	Vicky Wan	IT Manager	240-777-7722
4. Monitoring Locations	DEP/WMD	Meosotis Curtis	Manager	240-777-7726
D. Discharge Characterization (as described in Part III H. Assessment of Controls)				
E. Management Programs				
1. Stormwater Management				
1.a. Stormwater Facility Inspections and Maintenance	DEP/WMD	Amy Stevens	Manager	240-777-7766
1.b. Stormwater Management Permitting and Plan Review-Implement 2000 Maryland Stormwater Design Manual, and provisions of Maryland's Stormwater Management Act of 2007	DPS	Richard Brush	Manager	240-777-6343
2. Erosion and Sediment Control	DPS	Derek Isensee	Manager	240-777-6344

Table III.A.1. Organization Chart for Montgomery County Permit-Required Programs				
Part III. Standard Permit Elements	Responsible Party			
	Department	Name	Title	Telephone
3. Illicit Connection Detection and Elimination Program	DEP/DEPC	Steve Martin	Field Program Manager	240-777-7746
4. Trash and Litter	DEP/WMD	Leslie Wilcox	Planning Specialist	240-777-7786
	DEP/DSW	Dan Locke	Division Chief	240-777-6402
Property Management	DGS	David E. Dise	Director	240-777-9910
Road and Roadside Maintenance	DOT	Keith Compton	Highways Services Division Chief	240-777-7607
Public Education	DEP/WMD	Meosotis Curtis	Manager	240-777-7786
	DEP/WMD	Ryan Zerbe	Watershed Outreach Planner	240-777-7744
F. Watershed Assessment				
Countywide Monitoring	DEP/WMD	Meosotis Curtis	Manager	240-777-7726
Assessments and Project Implementation	DEP/WMD	Craig Carson	Manager	240-777-7709
G. Watershed Restoration				
Assessments and Project Implementation	DEP/WMD	Craig Carson	Manager	240-777-7709
Annual Reporting	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
H. Assessment of Controls (also see D. Discharge Characterization)				
H.1. Watershed Restoration Assessment				
Water Chemistry Monitoring	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
Biological and Physical Habitat Monitoring	DEP/WMD	Meosotis Curtis	Manager	240-777-7726
Design Manual Criteria Evaluation	DEP/WMD	Meosotis Curtis	Manager	240-777-7726
	DPS	Leo Galanko	Senior Permitting Services Specialist	240-777-6242
H.2. Stormwater Management Assessment				
Geomorphology / Hydrologic	DEP/WND	Meosotis Curtis	Manager	240-777-7726
I. Program Funding	DEPC/WMD DEP/WMD DPS DOT DOT DGS	Stan Edwards Steve Shofar Richard Brush Ligia Moss Keith Compton David Dise	Division Chief Division Chief Division Chief Senior Engineer Division Chief Director	240-777-7748 240-777-7736 240-777-6310 240-777-7514 240-777-7607 240-777-9910
J. TMDL	DEP/WMD	Meosotis Curtis	Manager	240-777-7711

Table III.A.1. Organization Chart for Montgomery County Permit-Required Programs				
Part III. Standard Permit Elements	Responsible Party			
	Department	Name	Title	Telephone
Part IV. Program Review and Annual Progress Reporting	DEP/WMD	Pam Parker	Senior Planning Specialist	240-777-7758
Part V. Special Programmatic Conditions	DEP/WMD	Meosotis Curtis	Manager	240-777-7711

DEPARTMENT ADDRESSES:

DEP/DEPC: *Department of Environmental Protection/Division of Environmental Policy and Compliance*
255 Rockville Pike, Ste 120, Rockville MD 20850

DEP/DO: *Department of Environmental Protection/ Director's Office*
255 Rockville Pike, Ste 120, Rockville MD 20850

DEP/WMD: *Department of Environmental Protection//Watershed Management Division*
255 Rockville Pike, Ste 120, Rockville MD 20850

DGS: *Department of General Services*
101 Monroe Street, 9th Floor, Rockville, MD 20850

DPS: *Department of Permitting Services/Division of Land Development Services*
255 Rockville Pike, 2nd floor, Rockville MD 20850

DPWT/DHS: *Department of Public Works and Transportation/Division of Highway Services*
101 Orchard Ridge Dr. 2nd Flr. Gaithersburg MD 20878

DPWT/DO: *Department of Public Works and Transportation/Division of Operations*
101 Orchard Ridge Dr. 2nd Flr. Gaithersburg MD 20878

OCA: *Office of the County Attorney*
101 Monroe St. 3rd Floor, Rockville, MD 20850

B. Legal Authority

The County maintains all legal authority required to meet the requirements of the MS4 permit. Including:

Chapter 19 of the Montgomery County Code - The Stormwater Management Ordinance

Chapter 19 was established to protect, maintain and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated land disturbance and increased stormwater runoff from developed and developing lands. Chapter 19 includes:

- Article I - Establishes the County's legal authority to administer a Sediment and Erosion Control program.
- Article II - Establishes the County's legal authority to administer a Stormwater Management Program.

- Article IV - Establishes the County's authority to regulate discharges of pollutants to County streams, and establish inspection and enforcement procedures and penalties for non compliance.

Chapter 19 was modified during the current Permit cycle to add:

Stormwater Management

In July 2010 and March 2011, the County Council passed Bill 40-10, later amended to Expedited Bill 7-11, which amends the County's stormwater management law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. The bills brought the County's stormwater management law into compliance with the Maryland Stormwater Management Act of 2007 and associated state implementing regulations adopted in 2010.

The revised County stormwater management law maintained more stringent requirements than State law for redevelopment sites to protect water quality. Specifically, the Maryland Stormwater Management Act of 2007 requires management of the first inch of runoff from 50% of the redevelopment site using ESD to the MEP. County law requires stormwater management to protect water quality volume (WQv- the first inch of runoff) and channel protection volume (CPv-the expected runoff from a 1-year 24-hour duration rainfall) from 100 percent of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

Sediment and Erosion Control

On March 29, 2013, the County Council passed Expedited Bill 1-13, Erosion and Sediment Control, which brings local erosion and sediment control requirements into compliance with the Maryland Stormwater Management Act of 2007 and the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. The County legislation mirrors the requirements in State law and regulations, including more stringent stabilization requirements and the establishment of maximum grading unit criteria.

Water Quality Protection Charge

In April 2013, the County Council passed Bill 34-12, Stormwater Management-WQPC. Bill 34-12 modified the structure of the County's original WQPC to comply with the 2012 State HB 987, the Stormwater Management- Watershed Protection and Restoration Program Bill.

Coal Tar Sealants

In September 2012, the County Council passed the Coal Tar Pavement Products Law, Bill 21-12, that banned the use of coal tar products, effective December 18, 2012. Under the law, use of a coal-tar based sealant can lead to a fine of up to $1,000—for both the property owner and the applicator.

Other Legislation Enacted During the Permit Cycle

Carryout Bag Law

The County passed the Carryout Bag Law, Bill 11-8, in January, 2012, to help the County meet Permit requirements related to trash reduction. The goal of the law was to increase awareness about the problem with disposable bag litter and to reduce the use of carryout bags. The Carryout Bag Law taxes 5 cents for each paper and plastic bag that a customer takes from certain

retail establishments to carry purchases out. The Department of Finance is responsible for enforcement of the Bag Law. Restaurants that use paper bags for carryout food do not need to charge the tax.

Adding Co-Permittees

The MDE modified the County's Permit effective January 26, 2004 to add six small localities as co-permittees for coverage under the Phase II of the NPDES MS4 Permit Program. In FY14, the County continued its oversight, inspection, and enforcement authority over the Towns of Chevy Chase, Kensington, Poolesville, and Somerset, and Chevy Chase Village; and one special tax district, the Village of Friendship Heights. Municipality contacts are shown in Table III.B.1.

Table III.B.1. List of Contacts for Municipalities Co-permittees

Municipality	Contact Name and Title	Address	Telephone
Chevy Chase Village	Shana R. Davis-Cook, Manager Michael Younes, Director of Municipal Operations	Village Hall 5906 Connecticut Avenue Chevy Chase, MD 20915	301-654-7300
Friendship Heights	Julian Mansfield, Village Manager	4433 South Park Avenue Chevy Chase, MD 20815	301-656-2797
Town of Chevy Chase	Todd Hoffman, Town Manager	4301 Willow Lane Chevy Chase, MD 20815	301-654-7144
Town of Kensington	Sanford Daily, Town Manager	3710 Mitchell Street Kensington, MD 20895	301-949-2424
Town of Poolesville	Wade Yost, Town Manager	P.O. Box 158 Poolesville, MD 20827	301-428-8927
Town of Somerset	Jeffrey Slavin, Mayor Rich Charnovich, Town Manager	4510 Cumberland Avenue Chevy Chase, MD 20815	301-654-1258

In January, 2010, MDE added MCPS as a co-permittee. MCPS designated Brian Mullikin, Environmental Team Leader, Division of Maintenance, and Agustin Diaz, Environmental Specialist, as staff responsible to implement stormwater management programs and coordinate on Permit issues. MCPS provided a detailed annual report on MS4 related activities, *MCPS Report to the County on MS4 Activities in FY 2014*, which can be found in Appendix C in the CD attachment to this report. This report includes information on MCPS MS4 related activities as appropriate.

EPA Region III Inspection

On June 27 and 28, 2013, EPA Region III inspected the County's MS4 Permit programs, including office visits and field inspections. The inspection primarily focused on the County's SWM Facility Maintenance and Inspections Program, Sediment and Erosion Control Program, IDDE program, and inspection of County facilities covered under the General NPDES Discharge Permit for Stormwater Associated with Industrial Facilities.

On February 18, 2014, EPA sent an electronic copy of their inspection findings. The report can be found in Appendix D. The County submitted a response on March 14, 2014. The response, with supporting documentation can also be found in Appendix D. As of July 1, 2104, EPA has not yet submitted a final inspection report.

C. Source Identification

The following information is submitted for all County watersheds in GIS format as required by the Permit in Part IV. and Attachment A, Annual Report Databases, Parts A.-L. The information can be found in this report's CD attachment in Appendix A, MDENPDES14.accdb, Parts A-L.

C.1 Storm Drain System

The County's storm drain inventory is found in Appendix A, MDENPDES14.accdb, Part A. Storm Drain System Mapping Associated with GIS Coverage. Each storm drain feature type is a feature class. Each feature class is a table in the database including both spatial and attribute information.

The storm drain inventory was compiled from three sources. It includes data captured by DPS during the new construction approval process from 2002 until January 10, 2013. It includes 1,404 drainage areas delineated in 2008 for all major storm drain outfalls (defined as >24") in the County, used to help investigate and track sources of illicit discharges in the County. The inventory also contains information for all storm drain outfalls on or immediately adjacent to MCPS property with associated drainage areas.

C.2 Urban Best Management Practices

The County's Urban BMP database as of June 30, 2014 with associated coverage is included electronically in Appendix A, MDENPDES14.mbd, Part B. The database uses the format required by the Permit's Attachment A., Annual Report Databases and Table B, Urban BMPs. There are 8,762 records in this database, shown by structure type in Table III.C.1. The greatest numbers of structure types are Dry Wells (2,383), Flow Splitters (992), Sand filters (783), and Oil Grit Separators (681).

There are a few data fields in the Urban BMP database with consistently missing data or data irregularities. Explanation for why data is missing, and what actions DEP is taking to complete the data, follows:

Drainage Area (DA)

Some structure drainage areas have not yet been delineated for a number of reasons. Pretreatment and diversion devices have identical DA's to their parent SWM BMPs and are not delineated separately. DEP is not delineating drainage areas for ESD practices at this time due to the level of effort needed to delineate a very small drainage area for a large number of practices (over 1,500) added to the database in FY13. DEP is instead concentrating on delineating the drainage areas of other, more significant SWM structures that are currently back logged.

Built Date

Built date was not recorded and cannot be determined from existing paper files for many of the pre-1996 structures. DEP adding built date data for the facilities entered into the database after 1996 where possible. Those facilities where a date cannot be determined have an entry date of 01/01/1111.

Structure Type

The MDE structure type designated as "Other" is frequently used by DEP. An explanation of how DEP classifies structures with an MDE "Other" structure type is included in general comments.

Permit Number

The DEP has included a "place-holder permit number" for the facilities that were built prior to 1986 and do not have a permit number. Because many of these facilities were built prior to Montgomery County's authority to permit such facilities, DEP will not be able to recover a permit number from the paper files. This place holder number is "0000000000" and represents DEP's final attempt to recover the data from the paper files. All original permit numbers known for the facilities built prior to 1986 have been entered into the database (typically a 6 digit number). In addition, a 10 digit place holder number beginning with 900118XXXX was also entered for those facilities built prior to 1986. This number was created by DPS in order for those facilities to be entered into their database system. The DEP has kept this permit number in order to allow interface with the DPS database. There are also data missing in the permit number field for facilities built after 1986. The DEP will work to pull the permit number from the paper files and as-built plans to populate this field.

ADC Map

The DEP made a concerted effort to populate the ADC Map field with the most recent ADC Map Book locations. The DEP's efforts specifically focus on those facilities that lack the MD grid coordinate data as it is understood that ADC map book location can be used in place of the Maryland grid coordinates. The DEP continues to default to populating this field when MD grid coordinates are not available.

RCN

The DEP's new asset and maintenance management system requires a number for all number fields. Those records with an RCN of "0" are records where the RCN was not provided in the paper files.

Construction Purpose

This is a new field and the data must be created for all existing BMPs. The DEP will populate the data for the MS4 FY15 annual report.

Impervious Area

This is a new field and the data must be created for all existing BMPs.

Last Inspection Date

This is a new field. The data reported is for the scheduled month of inspection. Actual inspection date is now being tracked in a separate field in the database (where it previously was not). DEP began reporting the actual date with this report and will continue to improve the data in future Permit reports. Future dates in the Last Inspection field indicate that the facility is scheduled for an inspection.

Where the date field contains a pre-2012 date (594 entries), one of two circumstances exists. Either 1) the inspections are due in 2014, but have yet to be performed by date of this report,

or 2) enforcement actions are pending. 559 facilities (6 percent) had last inspection in 2011, and are due again in 2014. However, the inspections have not been completed or scheduled as of the date of this report. An additional 35 facilities (.04 percent) were last inspected in 2010, however, the facilities require enforcement action and follow-up to ensure the inspection is completed.

Where the date field has been left blank (3,612 instances), one of two circumstances exists: 1) 1,665 inspections are technically not due until 2015 or later, so have not been scheduled and 2) 1,947 should have had an inspection. Of that 1947, 1,620 are ESD facilities for which DEP does not currently have an inspection paradigm because most of these practices are located on single family lots and many of DEP's current standard inspection and enforcement procedures are not appropriate. The DEP is developing a new process for inspection of ESD measures. The remaining 327 facilities are structural underground facilities and coordination must be made with property owners to have a confined space inspection performed before further DEP inspections can occur. DEP is working with property owners to schedule these inspection issuances.

WQ Volume

This is a new field and the data must be created for all existing BMPS.

Table III.C.1. FY14 Total Number of Storm Water BMP Facilities by Structure Type Designation

Practice Type	Code	Description	Number
Attenuation Swale	SW	Includes dry swales, wet swales, grass swales, and ESDSW	151
Bioretention	BR	Includes Bioretention, microbioretention (ESDMB), and rain garden (ESDRG)	475
Detention Structure	DP	Includes dry ponds	669
Dry Well	DW	Includes dry wells, stormchambers, raintank, and ESDDW	2,383
Environmental Site Design	ESD	Includes Environmental Site Design practices and Micro-infiltration trenches	234
Extended Detention, Dry	EDSD	Dry ponds with extended detention	60
Extended Detention, Wet	EDSW	Wet ponds with extended detention	157
Flow Splitter	FLSP		992
Hydrodynamic Structure: Oil Grit Separator	OGS	Includes Oil Grit Separators and water quality inlets	681
Hydrodynamic Structure: BaySaver	BS	Baysavers	138
Hydrodynamic Structure: Stormceptor	SC	Stormceptors	241
Infiltration Basin	IB	Includes infiltration basins with quality and quantity control	60

Table III.C.1. FY14 Total Number of Storm Water BMP Facilities by Structure Type Designation			
Practice Type	Code	Description	Number
Infiltration Trench	IT	Includes, infiltration trench with quality and quantity control, and buried surface fed,	688
Other	OTH	Includes structure types not identified by an MDE code, including stormfilters, aquafilters, aquaswirls, bayseparator-flowsplitters, Snouts, Treeboxes, Vortecnics, Vortsentry, and V2B1	380
Porous Pavement	PP	Includes porous concrete, asphalt, and pavers, and ESDPERMP	95
Sand Filter	SF	Includes surface sand filters and underground sand filters	783
Shallow Marsh	SM	Includes all constructed wetlands, artificial wetlands, shallow wetlands, and wetlands with extended detention	120
Wet Pond	WP	Includes retention ponds and wet ponds	45
Underground Storage	UGS	Includes underground storage vaults, pipes, and storage pipes with infiltration	410
		Total Number of Facilities	**8,762**

C.3 Impervious Surfaces

The County's 2009 impervious area with associated coverage can be found in Appendix A, MDENPDES14.mbd, Part C. Impervious Surfaces Associated with GIS Coverage. This impervious information was used to develop the Strategy.

In FY14, DEP continued to digitize and update impervious areas for the Permit requirements and the WQPC, based on 2012 aerial photography. DEP is also updating the drainage areas of all SWM BMPs. When complete, DEP will submit an updated layer of County impervious area, BMP drainage areas, and an updated analysis of the County's progress towards meeting the 20 percent impervious area control goal as of February 15, 2015. The analysis will be submitted to MDE by June 16, 2015, as part of the County's final Watershed Restoration Report.

C.4 Monitoring Locations

The GIS coverage and associated attribute information for locations established for chemical, biological, and physical monitoring of watershed restorations efforts required in Part III.H. Assessment of Controls, (Tables E., E.1., and E.2.; Monitoring Site Locations) can be found in Appendix A, MDENPDES14.accdb, Part E., E.1., and E.2. Monitoring Site Locations Associated with GIS Coverage.

C.5 Watershed Restoration

The GIS coverage and associated attribute information for watershed restoration projects proposed, under construction and completed with associated drainage areas can be found in Appendix A, MDENPDES14.accdb, Part D. Water Quality Improvement Project Locations Associated with GIS Coverage.

D. Discharge Characterization

The Permit requires that the County use discharge characterization monitoring gathered since the early 1990s and additional monitoring data required under the Permit to assess the effectiveness of its SWM programs and watershed restoration projects. The County must also document progress towards meeting the WLAs in EPA approved TMDLs for watersheds or stream segments located in the County. Discharge characterization results and County progress towards meeting WLAs can be found in Appendix A, MDENPDES14.accdb, Parts F., G., G.1., G.2., and H. Details about this monitoring can be found in Part III. H. *Assessment of Controls*.

E. Management Programs

E.1 Stormwater Management Program

Section E.1.a of the Permit requires the County to conduct preventative maintenance inspections of all SWM facilities on at least a triennial basis.

SWM Facility Inspections and Maintenance

The DEP SWM Facility Maintenance and Inspection Program oversees inspection and maintenance of all SWM facilities in the County. Program staff includes a manager, two field supervisors, six inspectors, three engineers, a planning specialist, a landscape architect, an office assistant and contractors.

The DEP performs structural maintenance on facilities owned by the County, MCPS, MNCPPC, and ESD practices located on County property and rights-of-way. All ESD facilities located on private property remain the responsibility of the property owners.

In 2003, the County enacted legislation giving DEP the authority to perform structural maintenance on residential SWM facility types defined in Chapter 3 of the 2000 Maryland Stormwater Design Manual. DEP then developed a process for private property owners, including Homeowner Associations (HOAs), to transfer their facilities into the DEP structural maintenance program, including executing maintenance agreements. Private property owners are responsible for all maintenance of facilities not transferred into the DEP's program.

The data reported for FY14 represents DEP's inspection and maintenance responsibilities as defined in County Code (Chapter 19) and Part III.E.1 of the Permit. DEP's SWM Facility Maintenance and Inspection Programs are funded by the WQPF.

SWM Facility Inspections

The DEP oversees inspection of all SWM facilities under County jurisdiction to assess repair and maintenance needs. In FY14, there were over 8,700 SWM facilities. DEP uses a contractor to

inspect all facilities every 3 years (triennial inspections). The County is divided into three geographical regions for triennial inspections (Figure III.E.1).

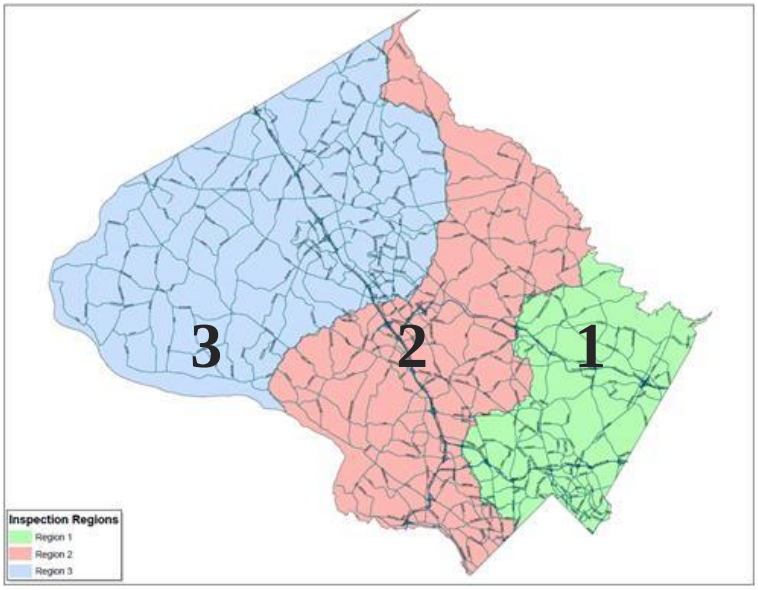


Figure III.E.1. Map of the Stormwater Facility Maintenance Regions

In addition to overseeing the triennial inspections, DEP staff inspects underground facilities annually. Inspection staff also performs unscheduled and compliance follow-up inspections as needed. In this reporting period, DEP staff or contractors performed over 3,000 inspections, as shown in Table III.E1.

Table III.E.1. Total Number of Inspections

Inspection Type	Publically Owned	Privately Owned	Total
Triennal Inspections			
Environmental Site Design	0	0	0
Filtering Systems[1]	41	251	292
Stormwater Infiltrations[2]	67	112	179
Oil/Grit Separators	16	58	74
Proprietary Hydrodynamic[3]	17	39	56
Stormwater Ponds[4]	47	211	258
Underground Storage	2	48	50
Stormwater Wetlands	6	23	29
Open Channel Systems[5]	0	5	5
Other[6]	35	165	200
Subtotal Triennial Inspections	**231**	**912**	**1143**

Table III.E.1. Total Number of Inspections			
Inspection Type	Publically Owned	Privately Owned	Total
Inspections Not Completed (as of June 30, 2014	68	164	232
Unscheduled Inspections	29	37	66
Annual Pre-Maintenance Inspections (UG Facilities)	288	500	788
Follow-up Maintenance Compliance Inspections	146	1177	1323
Total Inspections in FY14			**3552**

[1]This includes all aboveground and underground sand filters, proprietary filters such as Stormfilters, and Chapter 3 bioretention

[2]This includes trenches and basins

[3]This includes BaySaver, Stormceptor, vortechnices, and other proprietary hydrodynamic devices

[4]This includes all dry and wet ponds, and ponds with extended detention

[5]This includes dry swales and bioswales

[6]This includes all other type of devices not captured, including flow splitters

During FY14, DEP staff and contractors performed inspections in Regions 1 and 3. Of the 1375 SWM facilities due for triennial inspection, 1143 inspections were conducted. The remaining 232 facilities were not inspected due to site conditions or are currently scheduled to be completed in FY15. DEP schedules inspections and maintenance on a calendar year basis, so reports by fiscal year will always include information on facilities in two regions. The majority of the triennial inspections, as shown in Table III.E.1, occurred at three structure types—filtering systems (292), ponds (258), and other types (200). DEP also requires the inspection of flow splitters at the time of any stormwater facility inspection; these are included in the "Other" category.

There were 66 unscheduled inspections. These occurred in response to public complaints, at facilities being considered for transfer into DEP's SWM Facility Maintenance Program, and to assess conditions after a large storm event. Additionally, 788 pre-maintenance inspections were completed at underground facilities in order to screen for maintenance needs (see Modified Inspection Protocol for DEP Maintained Underground SWM Facilities). DEP staff also performed 1,323 follow-up inspections of privately maintained above ground and underground facilities. Follow up inspections are required to ensure that repair work is completed when a facility's maintenance need is ranked as "high" or "emergency" (see Privately Owned and Maintained *Facilities: Determining Maintenance Criticality and Enforcement*). Follow up inspections are also required to ensure routine cleaning/maintenance has been completed.

Maintenance

In addition to inspections, the DEP SWM Facility Maintenance Program oversees structural and non structural maintenance of all SWM facilities under the County's jurisdiction. There are two work sections based whether the SWM facilities are structurally maintained by DEP or by the private property owner:

- SWM Facilities publically or privately owned and structurally maintained by DEP. Includes over 3,000 facilities, of which 1,400 are privately owned (i.e., facilities that serve residential properties) and over 1,600are publicly owned (i.e., facilities that serve public schools).
- SWM facilities privately owned and structurally maintained by the private property owners. DEP's program ensures and enforces maintenance on over 5,600 privately owned facilities.

Maintenance Program Modifications During the Permit Cycle

During the Permit cycle, DEP modified the SWM Facility Maintenance Program in two ways to increase Program efficiency and reduce costs.

Privately Owned and Maintained Facilities: Determining Maintenance Need Level and Enforcement

During FY12-FY13, DEP launched a new protocol to rank the maintenance need level for privately owned and maintained facilities. DEP assigns a maintenance need level using results of the triennial inspection, which then informs what follow up notifications and enforcement actions DEP will initiate with the property owners. DEP defined the following maintenance need levels:

- EMERGENCY: Failure to perform repairs may result in a threat to public health and safety or significant structure failure and must be corrected immediately.
- HIGH: Repairs necessary to ensure the proper functioning of the facility, which, if not performed, could affect the structural integrity of the facility and impact water quality within the watershed. Deficiencies must be corrected within 60 days (aboveground) or 45 days (underground).
- ROUTINE: Repairs necessary to ensure proper functioning of the facility, which must be performed regularly and should be corrected within 60 days. If the deficiencies are not performed within the following 12 months they could elevate criticality of repairs to high level.

Modified Inspection Protocol for Underground SWM Facilities

In FY13, DEP developed and piloted a new inspection protocol for DEP maintained underground SWM facilities. Prior to FY13, DEP cleaned and inspected each underground facility annually regardless of the facility's condition, and performed maintenance if needed. DEP inspectors observed that certain facilities did not appear to require annual cleaning to function properly. DEP began performing an annual pre-maintenance inspection, using inspection criteria developed from best professional judgment, engineering expertise, and manufacturers' recommendations. Facilities deemed acceptably clean and functional were not cleaned, allowing the County to save maintenance costs.

The DEP found that over half of the DEP maintained facilities did not require any maintenance and could be expected to continue to function properly for at least another year without it. DEP continues to gather data on the condition of the underground facilities and their tendency to require less than yearly maintenance. Note that each underground facility is cleaned, inspected and maintained every 3 years at minimum as part of the required triennial inspection.

In January 2014, DEP extended the modified inspection protocol to privately maintained facilities. The new protocol includes an inspection in the 3 years between triennial

inspections to assess the condition of the facility (presence of sediment, trash, and debris, and/or repairs) and the need for maintenance. If the facility is a privately maintained facility, and fails the inspection, an NOV is delivered to the owner requiring maintenance within 45 days of the NOV. If the facility is a DEP maintained structure, a maintenance work order is opened and the County's contractor cleans and maintains the facility. Resulting savings to property owners and tax payers will help manage the maintenance costs of the increasing number of underground SWM structures installed to control stormwater runoff from new County development and redevelopment.

FY14 Repairs and Maintenance

Table III.E.2 provides numbers of repairs and maintenance at facilities during FY14 and a narrative summary is included below. During FY14, 1,871 SWM facilities were maintained by either the DEP SWM Facility Maintenance and Inspection Program or by the private owner of the facility.

Table III.E.2. FY14 Repairs and Maintenance	
Privately Owned and Maintained	Number of Facilities
Aboveground	144
Underground	454
DEP Structurally Maintained	Number of Facilities
Aboveground	425
Routine Sand Filter Maintenance	72
Underground	776
Total Number of Facilities Maintained	**1,871**

Privately Maintained Aboveground Facilities

During FY14, DEP issued 156 NOVs requiring correction of deficiencies noted during the triennial inspection. As a result, 113 facilities with a high or emergency maintenance need level were maintained by the private owner. Thirty-one (31) additional facilities were maintained in FY14 due to NOVs issued in FY13. DEP conducted a final inspection for each of these facilities to assure that the facilities were in compliance and properly functioning. DEP also transmitted over 181 routine maintenance notification letters to property owners in FY14. Inspectors conducted approximately 288 follow-up inspections to ensure compliance on the work orders.

Privately Maintained Underground Facilities

Private facilities are inspected in the 2 years between triennial inspections to assess the condition of the facility (presence of sediment, trash, and debris, and/or repairs) and the need for maintenance. If the facility fails the inspection, an NOV is delivered to the owner. DEP inspectors perform a final inspection on each facility to ensure it was maintained properly and notifies the property owner once the work is completed to satisfaction. In FY14, 454 underground facilities were privately maintained. Any repairs identified in the triennial inspection are also required to be completed at that time.

DEP Maintained Aboveground Facilities

In FY14, DEP used a general contractor to perform structural maintenance on 425 aboveground SWM facilities and ESD practices. This type of maintenance is considered routine and usually involves actions such as removing minor accumulations of sediment, unblocking clogged low flows, minor concrete repair, erosion repair, restoring/replenishing media, installing plants, and debris removal. DEP also performs routine maintenance on all sand filters for facilities in the maintenance program. Seventy-two (72) surface sand filters had routine sand filter maintenance (i.e., scarification) performed by DEP and 12 ponds have regular mowing and monthly trash removal performed by DEP contractors.

DEP Maintained Underground Facilities

During FY14, DEP performed cleaning and repairs on 776 underground facilities. The facilities included 33 located at County maintenance depots that are maintained twice a year, 3 BaySavers at a bus depot that are maintained 6 times a year, and 3 Stormceptors at the Transfer Station that are maintained 3 times a year.

Maintenance of ESD Facilities on County Property

The DEP is constructing many new ESD projects on County property and ROWs as one strategy to meet the Permit's impervious area control requirement. In FY14, DEP expanded routine contract maintenance to those publically owned ESD facilities, from 47 bioretention or rain gardens maintained in FY13, to 58 in FY14. In addition, 24 County owned facilities were repaired and reconstructed. The facilities were maintained monthly using a trained and dedicated crew to ensure consistency. The contractor was compensated on average for one hour of labor per crew at a cost of $135/per facility per month. Additional costs for materials, including plants, mulch, and watering, concrete, stone, and soils, brought the estimated total cost to approximately $2,000 per facility per fiscal year for maintenance. Routine maintenance tasks varied according to season and included weeding, removing trash and other debris, edging, removing sediment, mulch redistribution and replenishment, pruning, watering and plant replacement. To better coordinate shared maintenance responsibilities with schools, parks, and private facilities, and in anticipation of new coming facilities currently under design or construction, DEP bid and contracted a new vendor for landscape maintenance. Beginning mid FY15, the contractor will provide routine and preventative maintenance for 116 publically owned facilities. The number of publically owned ESD facilities will continue to grow as DEP completes construction of additional facilities.

Frequency and type of maintenance varies depending on several factors including size, drainage area, plant composition, impacts from stormwater, humans and vehicles, site safety, and visibility. Monthly maintenance of the ESD facilities successfully addresses the maintenance variability and ensures that the practices are functioning as designed. DEP has incorporated lessons learned to improve inspection and contracting needs for ESD practices, to better educate the public, landowners, school, and park administrators with ESD facilities, and to lower overall costs through more efficient maintenance planning. Community residents have expressed appreciation for the ESD facilities, and DEP maintenance, as well as DEP's efforts to address community concerns.

DEP is now a more significant stakeholder of the ROWs, sharing spaces with gas lines, water lines, power lines, and transportation. The maintenance program has worked to develop new and

mutually cooperative relationships with public utilities such as Washington Gas and WSSC, as well as DOT, to manage maintenance needs among all groups sharing the right of way to deliver community services.

Inspection and Maintenance Outreach Activities

In FY14, the DEP SWM Facility Maintenance Program continued to create multiple publications and hosted several presentations to increase understanding and awareness of County SWM facility maintenance. In addition, the Program staff works with DEP outreach staff, providing SWM maintenance related publications for dissemination at public events. The two sections work together to provide an opportunity for County resident volunteers to learn about the function of SWM ponds during annual pond clean up events. For more information, please see Part III.E.7. Public Education.

Lessons Learned During the Permit Cycle: Challenges and Successes

During the Permit cycle, DEP has developed several new protocols in order to remain in compliance with County and State SWM facility maintenance requirements and regulations while remaining fiscally responsible:

- During the Permit term, DEP embarked on one of the first ESD maintenance programs in the metropolitan area. Between FY12 and FY13, DEP experienced some challenges to find the right combination of contractor specifications, direction, and maintenance frequency to ensure the ESD features in the ROW Green Streets Program (see page III-94) were functioning properly, while meeting aesthetic expectations of the residents. DEP eventually recognized that ESD features require at least 10 months of maintenance to ensure functionality. Early in FY14, DEP found that the general contractor labor force does not have the mobilization, and set-up to frequently maintain ESD facilities. To assist in addressing this gap, DEP then developed an innovative contract targeted to local small business landscape contractors, who are more accustomed to frequent maintenance on gardens and other landscaped features, at reduced maintenance costs. The contracts were not fully executed by the end of FY14, and are expected to be fully used in FY15.
- In FY15, many of the first permitted and installed ESD facilities will be due for triennial inspections, and ESD inspections will increase dramatically. Utilizing staff expertise and consultants, DEP is developing necessary policies and procedures for ESD related inspections, enforcement and administrative processes, and has hired a staff member dedicated to this task. DEP expects to pilot a residential ESD inspection and maintenance program during FY15-FY16.

Co-Permittee Structural and Nonstructural Maintenance on SWM BMPs-MCPS

The MCPS Division of Maintenance upgraded and repaired existing underground and aboveground SWM facilities in FY14, in preparation for transferring maintenance responsibility to DEP in accordance with a MOU signed by both parties in 2007. The MCPS also performed nonstructural maintenance on aboveground SWM facilities, and maintained several underground facilities not eligible for transfer to the County. MCPS contracts out the maintenance on ESD facilities (bioretention and green roofs). The cost of the FY14 MCPS SWM facility maintenance and inspection program was $341,238.

Stormwater Management Plan Review and Permitting

Complying with the Maryland Stormwater Management Act of 2007

Section III.E.1.b of the Permit requires the County to implement the SWM design policies, principles, methods, and practices found in the *2000 Maryland Stormwater Design Manual* and the provisions of Maryland's *Stormwater Management Act of 2007*. The Permit requires the County to modify its SWM ordinances, regulations and new development plan approval processes within 1 year after State adoption of regulations; April 24, 2009, with an effective date of May 4, 2009.

In July 2010 and March 2011, the County Council passed Bill 40-10 which amended the County's SWM law to require management of stormwater runoff through the use of nonstructural BMPs to the MEP for new development and redevelopment projects approved by DPS. In response to MDE concerns that a portion of Bill 40-10 was less restrictive than State law, Bill 40-10 was amended in March 2011 as Expedited Bill 7-11, which limited certain alternative SWM measures to redevelopment only. The bills then brought the County's stormwater management law into compliance with the Maryland Stormwater Management Act of 2007 and associated state implementing regulations adopted in 2010.

The revised County stormwater management law maintained more stringent requirements than State law for redevelopment sites to protect water quality. Specifically, the Maryland Stormwater Management Act of 2007 requires management of the first inch of runoff from 50 percent of the redevelopment site using ESD to the MEP. County law requires stormwater management to protect water quality volume (WQv- the first inch of rainfall) and channel protection volume (CPv-the expected runoff from a 1-year 24-hour duration rainfall) from 100 percent of the redevelopment site, and requires the use of ESD to the MEP to meet these standards.

The DPS has been reviewing all development projects submitted since then to assure compliance with the 2007 Stormwater Design Manual. Consequently, there has been a considerable increase in type and number of nonstructural practices for new development and redevelopment in the County.

Stormwater Management Plan Review and Permitting – Incorporating ESD

The Permit also requires the County to review local codes and ordinances to identify impediments to and opportunities for promoting ESD to the MEP within 1-year, and to remove those impediments within 2 years of the Permit's issuance.

In December 2010, the County released the report "*Implementing Environmental Site Design in Montgomery County*", which summarizes how the County's codes, regulations, programs, and policies may need to be updated to allow the use of ESD and ESD techniques to the MEP. The most significant barriers, gaps and opportunities were identified in the County's Zoning Ordinance and the Development Review Process. The report is summarized in Table III.E.3. The Report is publicly available on the County's website at:

http://www6.montgomerycountymd.gov/content/dep/downloads/water/Implementing_ESD_Report_FINAL_110910.pdf

Table III.E.3. Summary of General Findings, ESD Barriers, Gaps, and Opportunities	
Significant Barriers, Gaps, or Opportunities	Fewer but Important Barriers, Gaps, or Opportunities
• Ch 59. Zoning • Development Approval Process	• Ch 22. Fire Safety Code • Ch 26. Housing and Building Maintenance Standards • Ch 49. Streets and Roads • Ch 50. Subdivision of Land • Commercial-Residential ZTA
Limited Barriers, Gaps, or Opportunities	No Barriers or Gaps
• Ch 8. Buildings • Ch 22A. Forest Conservation – Trees • Ch 40. Real Property • Ch 41. Recreation and Recreation Facilities • Ch 58. Weeds • Trees, Approved Technical Manual (MNCPPC)	• Ch 14. Development Districts • Ch 18A. Environmental Sustainability • Ch 21. Fire and Rescue Services • Ch 24B. Homeowners' Associations • Ch 27A. Individual Water Supply and Sewage Disposal Facilities • Ch 36. Pond Safety • Ch 44. Schools and Camps • Ch 45. Sewers, Sewage Disposal and Drainage • Ch 54A. Transit Facilities • Ch 56. Urban Renewal and Community Development • Guidelines for Environmental Management of Development in Montgomery County (MNCPPC)

In 2007, the M-NCPPC Department of Planning began a rewrite of the County's antiquated zoning code, Chapter 59, as ordered by the Montgomery County Council. The Planning Department worked with a consultant, a citizen's advisory group (Zoning Advisory Panel), and with other County agencies to accomplish the rewrite. A completed Consolidated Draft was released July 2012. The rewrite sections were reviewed as they became available, first by the Planning Department, then by other County Agencies, and then by the Zoning Advisory Panel and general public. A summary of ESD code review recommendations and how they were addressed during the Zoning Code rewrite can be found on the CD attachment to this Report in Appendix E.

There was significant additional opportunity for comment during the Public Hearing Draft Review period, and in the Planning Board and County Council review processes. Table III.E.4, below, shows the timeline for the Planning Department zoning code rewrite.

Table III.E.4. Draft Zoning Code Rewrite Timeline	
Complete Zoning Code Rewrite Draft	
July 2012	Consolidated Draft (Public Hearing Draft) released
Summer - Fall 2012	Planning Department work sessions
December 2012 - January 2013	Finalize Planning Board Consolidated Draft
May 12, 2013	Draft transmitted to the County Council for review
Summer 2013- Fall 2013	The Council Planning, Housing and Economic Development committee (PHED) holding work sessions
November 12 and 14, 2013	Full Council will hold public hearings on the revised preliminary draft text
December 2013	PHED finalized the PHED draft, which can be found at http://montgomeryplanning.org/development/zoning
March 5, 2014	County Council adopted the Zoning Code
September 30, 2014	ZTA 14-09, which incorporates updates, clarifications, and corrections into the new zoning code, was adopted by County Council.
October 30, 2014	The new Zoning Code, Chapter 59 of the Montgomery County Code, takes effect

Additional Efforts to Incorporate ESD

The DPS, fellow agencies and members of the stormwater management construction community formed a Policy and Design Committee and a New Products Committee to assess design and maintenance aspects of various ESD practices. The committee's goal is to assure that these practices provide cost-effective designs that provide maximum runoff reduction and pollutant removal without increasing average maintenance cost per facility.

The County's Executive Branch (DPS, DOT, and DEP) and Planning Board agencies continue working together on the "Streamlining the Development Process" initiative. The workgroup presented recommendations to Council in September 2012 that identified areas for improvement including publication of approved ESD technologies to facilitate implementation, adopting guidelines for use of ESD practices in the right of way, and completing and publishing Context-Sensitive Road Designs.

The DEP is working with DOT to include ESD measures in the County ROW, as part of a Green Streets pilot program. For more information see Part G. Watershed Restoration. County partners have learned much through the evaluation, design, and construction process, particularly working with limitations presented by existing gray infrastructure that cannot be readily re-located. DEP and DOT are now drafting technical standards for some of these practices, which will greatly facilitate implementation and reduce overall costs for using these practices as retrofits.

The DEP invests considerable staff time and resources to promote ESD outreach to communities. DEP hopes to increase community acceptance of these practices and future stewardship for routine maintenance of the roadside ESD practices. Watershed groups, such as the ANS and the

Friends of Sligo Creek (FOSC) provided assistance to DEP outreach efforts, both for the Green Streets pilot and also for residential properties retrofits through the RainScapes Neighborhoods program. In FY13, DEP's SWM Facility Maintenance and Inspection Program also developed numerous fact sheets designed to provide assistance to residents on how to maintain their ESD practices including rain barrels, rain gardens, grass swales, buried dry wells, porous pavements, and green roofs. The fact sheets are available on DEP's website at http://www.montgomerycountymd.gov/DEP/water/stormwater-facilities.html

MDE Review of the County's Stormwater Management Program

Section III.E.1.c. of the Permit requires the County to maintain programmatic and implementation information according to the requirements established as part of MDE's triennial stormwater program review.

In April 2013, MDE completed a review of the County's stormwater management program, including evaluation of implementing ESD to the MEP in the County's plan review and approval process. MDE found the County's program to be acceptable under State law and in compliance with Part III.E.1 of the Permit. MDE's approval letter, with the County's response, can be found in Appendix F.

E.2 Erosion and Sediment Control

Section III.E.2 of the Permit requires the County to maintain an acceptable erosion and sediment control program, including implementation of improvements identified in MDE's biennial evaluation of the County's ESC program. The Permit also requires the County to conduct responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance, and to report quarterly information regarding earth disturbances exceeding 1 acre.

MDE performed a biennial evaluation of the County's ESC program as part of their review of the County's application for the delegation of ESC enforcement authority in November of 2013. Continued delegation was granted through June 30, 2016 by Brian Clevenger, Program Manager of MDE's Sediment, Stormwater and Dam Safety Program in a letter dated January 6, 2014. In that letter, MDE "has also determined that the County's program is in compliance with the erosion and sediment control program elements stipulated in Part III.E.2 of the Montgomery County MS4 Permit".

In FY14, 18,151 ESC inspections were performed. Enforcement actions included 520 NOVs and 160 civil citations which collected $82,350.50.

Responsible Personnel Certification

In FY14, MDE developed an online class to certify responsible personnel in erosion and sediment control. Ray Bahr, in a personal communication with the DPS Field Supervisor Derek Isensee, indicated that the online class "will constitute Montgomery County's RPC efforts and comply with the County's MS4 permit conditions". At least three times per year prior to FY14, the DPS, Land Development Division, Sediment and Storm Water Section conducted a "Responsible Personnel Certification" course. Documentation on these courses can be found in Appendix A, MDENPDES14.mbd, Part J. Responsible Personnel Certification.

Quarterly Grading Permits

Quarterly grading permit information for earth disturbances in the County of 1 acre or more can be found in Appendix A, MDENPDES14.mbd, Part K. Quarterly Grading Permit Information.

E.3 Illicit Discharge Detection and Elimination (IDDE)

The Permit requires the County to implement an inspection and enforcement program to ensure that all non-stormwater discharges to the municipal separate storm sewer system are either permitted by MDE or eliminated. The permit requires field screening of at least 150 outfalls annually, with field water chemistry analysis of dry weather discharges according to parameters specified in the Permit's Attachment A, Annual Report Databases, Part I. Illicit Discharge Detection and Elimination.

Outfall Screening

In FY14, DEP performed outfall screening in the Little Falls watershed, Figure III.E.2, below. DEP screened 154 outfalls and found 66 with dry weather flow (34 with dry weather flows and 32 piped streams). Screening teams walked the entire length of the stream beds within the watershed to identify all outfalls. This method allowed DEP to identify 110 new outfalls that were not mapped in the storm drain inventory. DEP performed field testing on the dry weather flows for permit required water chemistry parameters and also for ammonia, potassium and fluoride.

Of the 34 outfalls found to have dry weather flow, field water quality testing found that 19 had elevated parameters as measured during the initial screening, and follow up investigations were performed. Of those 19 outfalls, 16 were found to have normal water chemistry parameters during follow up visits. Table III.E.5 shows the problems identified at the remaining outfalls.

Table III.E.5. Investigation Results of Suspected Illicit Discharges During FY14

Outfall ID	Location	Problem Found	Resolution
GM562P0600	Shops at Sumner Pl.	Sewage Discharge from private facility	Property Management working to correct
HN121P0329	Arlington Road	Suspected Sewage Discharge	Continuing to investigate source
HM343P0106	Willard Ave.	Wastewater cross-connection to storm drain	NOV issued and problem corrected
HM343P0106	Willard Ave.	Discharge from parking garage cleaning	Required change to cleaning procedures

For FY15, DEP will screen outfalls in the Lower and Middle Mainstem subwatersheds of the Northwest Branch subwatershed of the Anacostia.

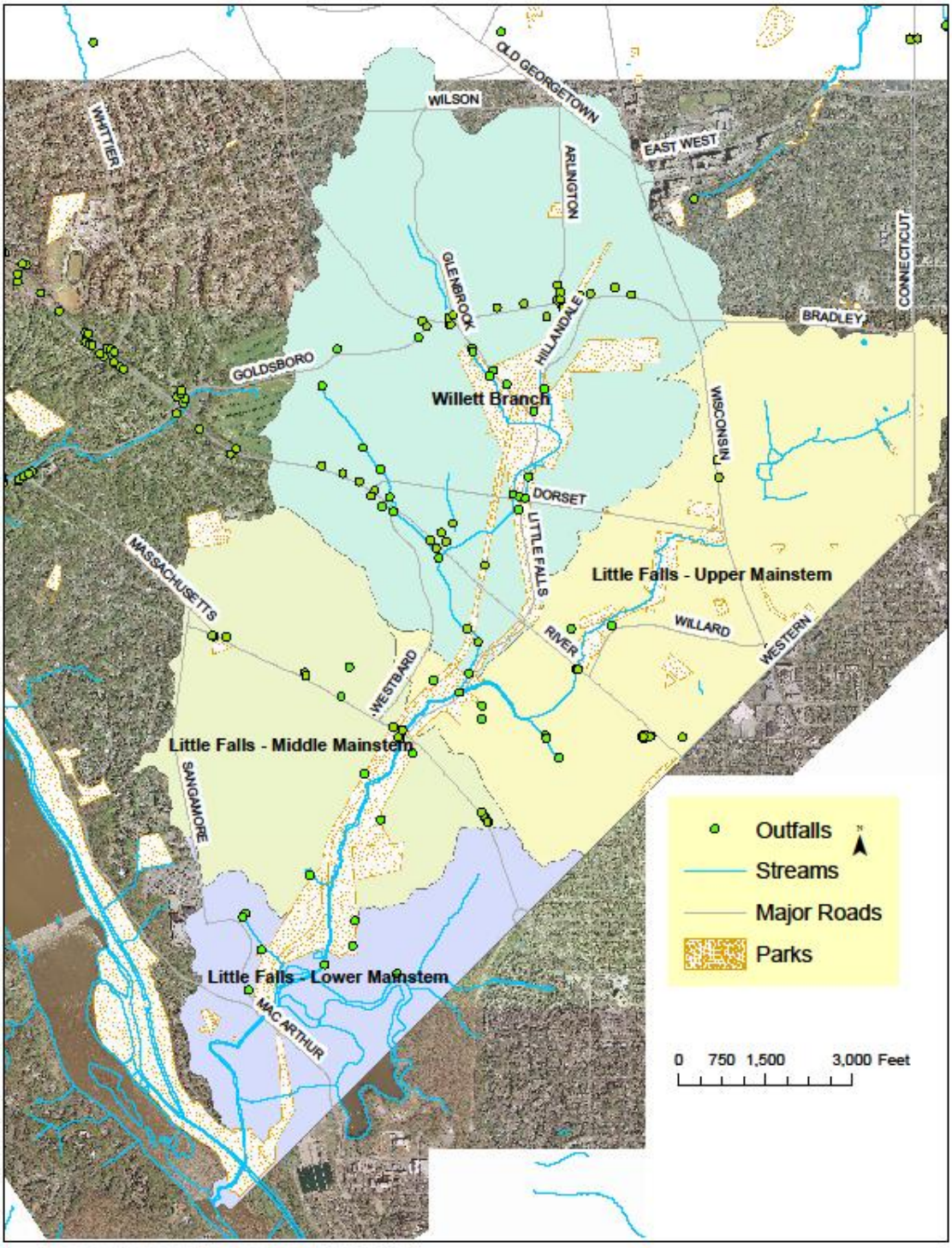


Figure III.E.2. FY13 Outfall Screening – Coquelin Run, Kensington Branch and KenGar Tributaries of the Lower Rock Creek Watershed

WSSC Sanitary Sewer Overflow Follow Up Investigations

The DEP is continuing to work with WSSC by performing follow-up site visits for reported sanitary sewer overflows (SSOs) in the County, and performed 88 site visits in FY14. DEP verifies that SSOs have been corrected, ensures adequate cleanup and treatment of all affected areas, and ensures that adequate public notice signage has been posted in affected areas. Also, DEP is continuing to work with WSSC's Fats, Oils and Grease (FOG) Program on restaurant grease issues.

CCTV Inspections in the Sligo Creek Subwatershed of the Anacostia

In FY14, DEP worked with a contractor to perform CCTV inspections of two dry weather discharges detected during IDDE outfall screenings in FY11. Previous DEP efforts to track these discharges to their sources by following manholes and performing above ground inspections were not successful. The CCTV inspections showed the following:

- Wayne Avenue Discharge - CCTV inspection determined that a dry weather discharge originated from an underground SWM management facility behind a shopping center. The SWM facility received runoff from a loading dock and dumpster area behind a grocery store. DEP worked with the shopping center property owner to clean the underground SWM facility and repair any leaking dumpsters.
- Maple Avenue Discharge - CCTV inspection identified several small flows originating from apartment building HVAC units. A subsequent inspection of the Maple Avenue outfall also identified flow coming from a large underground SWM facility. Other investigations of smaller flows revealed a clogged storm drain referred to DOT for repair.

Illicit Discharges from Rooftop HVAC Units- Pilot Study

During FY12 and FY13, DEP partnered with the CWP to focus IDDE efforts in the Sligo Creek subwatershed of the Anacostia. During the IDDE investigations, the team discovered three dry weather discharges with high ammonia levels which were traced to HVAC units. High levels of ammonia were found in discharges from cooling towers as well as air conditioner condensate discharges. Limited sampling conducted by CWP suggested pollution loading for nitrogen, copper and zinc as well. Investigations determined that all three HVAC systems were maintained with nitrogen or ammonia based antimicrobial products.

In FY14, CWP and DEP performed a pilot research project to investigate the source and extent of nitrogen compounds and other pollutants associated with HVAC systems, and to explore recommendations to address these pollution sources. The study was completed and is summarized below. The full report "Final Report for IDDE Special Study" can be found in Appendix G in the electronic attachment.

The study focused on the downtown areas of the Sligo Creek watershed (Figure III.E.3). During street level inspections, perimeters of selected buildings were walked to look for rooftop discharges draining to sidewalks, street or storm drain systems. Water quality parameters were analyzed at street level, including ammonia, copper, temperature, pH and flow. An action level threshold for further investigation was defined as presence of ammonia (>0.2 mg/l) and/or presence of copper (>0.1 mg/l). Samples were collected at each site for lab analysis of total dissolved nitrogen. At every fifth site a sample was collected and sent to the lab for copper (dissolved) and zinc (dissolved) analysis. Duplicate samples were taken for total nitrogen by

each of the two teams one time per day to determine reproducibility and consistency of the lab methods. Follow-up interviews of building managers or those familiar with management of the HVAC system were conducted.

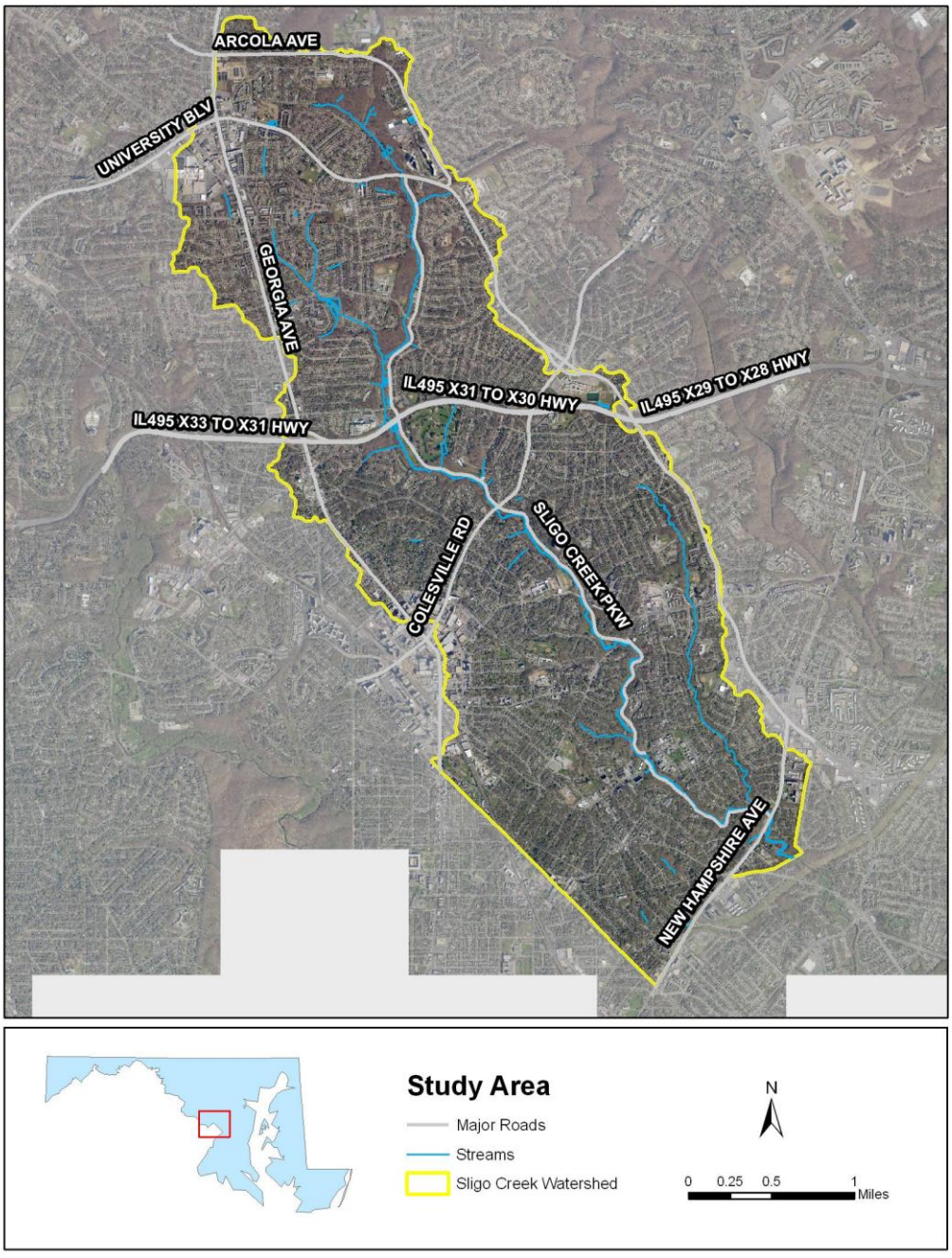


Figure III.E.3. Map of the Sligo Creek Watershed Study Area

Field crews sampled 86 sites, and found 33 with discharges. Water analysis results from the street-level inspections are summarized in Table III.E.6. All discharges exceeded the ammonia threshold of 0.2 mg/L and were suspected to be HVAC discharges. Mean ammonia concentrations from this study were well above the USEPA chronic water quality standard at 4.17 mg/L. Mean total nitrogen concentrations were 4.56 mg/L. The pH values ranged from 4.7 to 8.7, and temperature ranged from 19.8°C to 37.7°C. All of the laboratory-analyzed samples for metals were approximately ten times greater than the Maryland water quality standards (Figure III.E.4). Maryland's water quality standard for zinc is 0.12 mg/L; for copper, it is 0.013 mg/L (acute) and 0.009 mg/L (chronic) to protect aquatic life from toxicity.

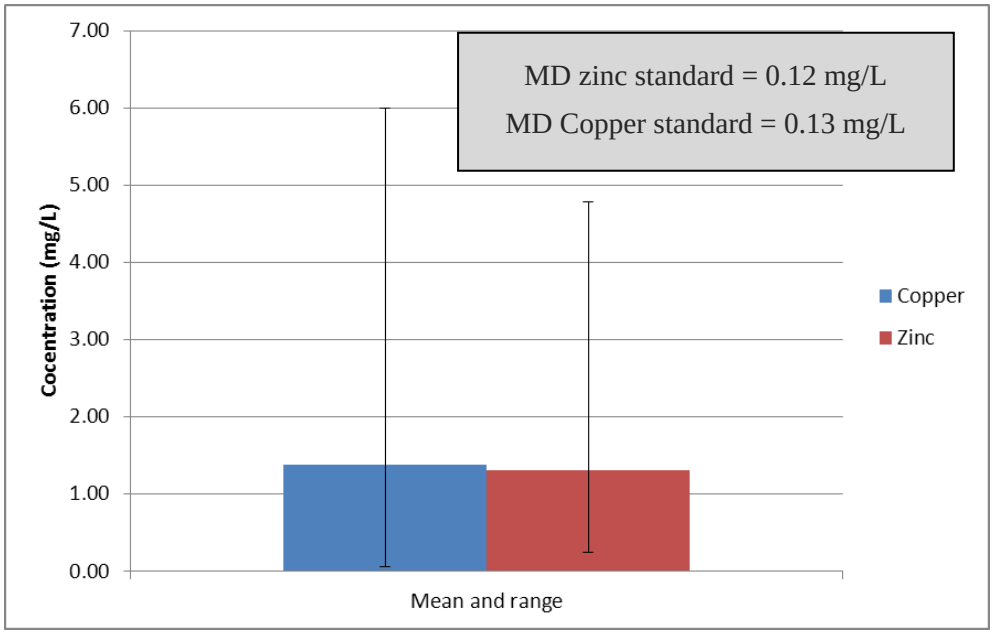


Figure III.E.4. Heavy Metal Concentrations from HVAC Discharges (n=9)[1]

[1]The toxicity of Cu and Zn will vary based on water hardness and pH (i.e. lower toxicity as hardness of water increases).

Table III.E.6. Suspected HVAC Discharge Water Sample Analysis Results[a]								
	Field					Laboratory		
	Ammonia (mg/L)	Copper (ppm)	Flow (gallons/day)	Temperature (°C)	pH	Total Nitrogen (mg/L)	Copper (mg/L)	Zinc (mg/L)
Mean	4.6	0.1	137.1	29.2	6.3	4.6	1.4	1.3
Median	5.0	0.0	57.0	29.5	6.7	4.2	0.3	0.7
Standard Deviation	1.9	0.3	196.4	3.6	0.9	2.3	2.3	1.5
COV[b]	0.4	0.4	1.4	0.1	0.1	0.5	1.7	1.1
Minimum	0.3	0.0	9.7	19.8	4.7	0.8	0.1	0.3
Maximum	10.0	1.0	799.1	37.7	8.7	10.5	6.0	4.8

[a] Number samples (n)=33, except for zinc

[b] COV = Coefficient of Variation

[c] Number samples (n)=9

Interviews were conducted at nine sites, five of which had cooling towers. Interviewees generally did not know whether condensate or cooling tower water drained to the storm drain or sanitary system. All interviewees reported that their systems received regular service by an external contractor. Condenser coils were generally cleaned on an annual or semi-annual frequency either by vacuum or high-pressure water jet and sometimes with ammonia-based anti-microbial products. Biocide products were also used in A/C drip pans at several sites to control the growth of algae, mold, and fungi and to eliminate odors and pan corrosion.

Rooftop inspections confirmed HVAC discharges to the storm drain at two locations. One additional inspection determined that the discharge was not associated with an HVAC system but was actually tied to a first-floor refrigeration unit at a restaurant. Two other inspections were inconclusive.

Additional work is needed to define an "HVAC fingerprint" to aid illicit discharge investigations. The following characteristics provide a starting point.

- Ammonia concentration greater than 4.0 mg/L.
- Copper concentrations greater than 0.2 mg/L. Copper field test kits may not be sufficient for copper detection so samples may require laboratory analysis.
- An absence of detergents.

The County Water Quality ordinance prohibits anything other than clean water from being discharged to the MS4 system, and would apply to HVAC discharges. The cooling tower discharges should be connected to the sanitary system, but WSSC does not currently accept HVAC condensate discharges. MDE should address HVAC discharge pollution at a statewide-scale since it is unlikely that this source is limited to only Montgomery County. If condensate cannot be directed to WSSC, the following strategies should be undertaken:

1. Work with property owners to eliminate the use of biocides in A/C drip pans and condenser coils. A/C drip pans can be cleaned regularly with mild soap and water.
2. Encourage property owners to clean condenser coils monthly or quarterly, preferably by vacuum or other dry methods or with mild detergent solution if needed.
3. Drain condensate lines to landscaped areas and not the street or storm drain system. On-site treatment options can be explored with MDE.
4. Re-use condensate, where possible, in subsurface irrigation systems or in cooling towers.

Water Quality Investigations During FY14 (7/1/13 – 6/30/14)

For the FY14, the DEP DEPC investigated 238 water quality issues (150 complaints and 88 SSO's) and 26 hazardous materials related cases, which resulted in the issuance of 34 formal Enforcement Actions (6 Civil Citations with fines totaling $3,000 and 28 NOVs) and 34 Warning Letters. The formal Enforcement Actions are summarized in the following Table III.E.7.

Table III.E.7. FY14 Stormwater Discharge Enforcement Cases

No.	Case Number	Date	$ Fine	Case Type	Case Sub-Type	Citation #
1	2013967	7/24/2013	$500	Stormwater	Pollutant Discharge	6Z39883234
2	20131060	8/22/2013	$500	Water	Chemical Discoloration	0Z39883235
3	2013867	7/2/2013	$500	Stormwater	Pollutant Discharge	1Z39882039
4	2014403	4/2/2014	$500	Water	Chemical Discoloration	2Z39882040
5	2013984	9/23/2013	$500	Stormwater	Pollutant Discharge	3Z39883196
6	20131196	10/1/2013	$500	Stormwater	Pollutant Discharge	5Z39889659
7	2013877	7/1/2013	NOV	Stormwater	Pollutant Discharge	N/A
8	2013931	7/12/2013	NOV	Stormwater	Pollutant Discharge	N/A
9	2013938	7/16/2013	NOV	Stormwater	Pollutant Discharge	N/A
10	2013938	7/16/2013	NOV	Stormwater	Pollutant Discharge	N/A
11	2013944	7/18/2013	NOV	Stormwater	Pollutant Discharge	N/A
12	2013944	7/18/2013	NOV	Stormwater	Pollutant Discharge	N/A
13	2013944	7/18/2013	NOV	Stormwater	Pollutant Discharge	N/A
14	2013954	7/22/2013	NOV	Stormwater	Pollutant Discharge	N/A
15	2013984	7/30/2013	NOV	Stormwater	Pollutant Discharge	N/A
16	2013984	7/30/2013	NOV	Stormwater	Pollutant Discharge	N/A
17	20131178	9/20/2013	NOV	Stormwater	Pollutant Discharge	N/A

Table III.E.7. FY14 Stormwater Discharge Enforcement Cases						
No.	Case Number	Date	$ Fine	Case Type	Case Sub-Type	Citation #
18	20131183	9/20/2013	NOV	Stormwater	Pollutant Discharge	N/A
19	20131329	11/1/2013	NOV	Stormwater	Pollutant Discharge	N/A
20	20131414	11/25/2013	NOV	Stormwater	Pollutant Discharge	N/A
21	20131486	12/9/2013	NOV	Stormwater	Pollutant Discharge	N/A
22	20131503	12/17/2013	NOV	Stormwater	Pollutant Discharge	N/A
23	20131529	12/19/2013	NOV	Stormwater	Pollutant Discharge	N/A
24	2014221	2/4/2014	NOV	Stormwater	Pollutant Discharge	N/A
25	2014240	2/6/2014	NOV	Water	SSO	N/A
26	2014260	2/18/2014	NOV	Stormwater	Pollutant Discharge	N/A
27	2014264	2/21/2014	NOV	Water	Petroleum In Water	N/A
28	2014410	4/1/2014	NOV	Stormwater	Pollutant Discharge	N/A
29	2014765	5/20/2014	NOV	Stormwater	Pollutant Discharge	N/A
30	2014765	5/20/2014	NOV	Stormwater	Pollutant Discharge	N/A
31	2014805	5/28/2014	NOV	Stormwater	Pollutant Discharge	N/A
32	2014835	6/5/2014	NOV	Stormwater	Pollutant Discharge	N/A
33	2014863	6/12/2014	NOV	Stormwater	Pollutant Discharge	N/A
34	2014893	6/19/2014	NOV	Stormwater	Pollutant Discharge	N/A

E.4 Trash and Litter

FY14 County Trash Reduction Initiatives

The DEP continues to implement the enhanced trash reduction components of the Strategy to meet the Permit requirements for progress toward the Potomac Trash Free treaty goals and the Anacostia trash TMDL. The Strategy outlines a number of cost-effective litter control methods to meet targeted reductions. County efforts include anti-litter campaigns, recycling education, enforcement, the Carryout Bag Law, and increased litter removal from County "hot spots", such as Transit stops.

Anti-Litter Public Awareness Campaign

The County is working with the Anacostia Watershed Restoration Partnership, the Alice Ferguson Foundation, and other regional partners to implement initiatives that will help the region meet the goal of a Trash Free Potomac and the Anacostia TMDL for trash. This regional

effort has produced a unified anti- litter message for advertising in print media, on buses, and on bus shelters in Montgomery County. DEP's outreach and education programs for anti-littering can be found in Part III.E.7, Public Outreach and Education.

Recycling Initiatives

According to the MDE's Calendar Year 2012 Maryland Waste Diversion Rates & Tonnages Report, Montgomery County's overall recycling and waste diversion rate, was 59.8 percent. The County has a goal to reduce waste and recycle 70 percent of all waste by 2020.

The DEP's DSWS continues to conduct extensive outreach, education, training and enforcement programs to increase awareness of waste reduction and recycling. During FY14, staff and DSWS Recycling Program volunteers participated in 288 outreach and education events, providing 36,849 people with assistance and information on waste reduction, recycling, buying recycled, composting, grasscycling and other topics. The County continues to utilize a corps of dedicated volunteers to educate others on the benefits of and the need to recycle. Together, the volunteers contributed nearly 1,726 hours of direct service with an estimated value of $43,144. More detailed information on DSWS's outreach activities and other trash and litter reduction measures can be found in the Division's Quarterly Reports, posted at:

http://www6.montgomerycountymd.gov/swstmpl.asp?url=/content/dep/solidwaste/news/monthly_reports.asp

During FY14, DSWS staff continued efforts to conduct on-site consultations to businesses, organizations, and local, state and federal government facilities providing technical assistance, hands-on guidance, and specific recommendations on setting up, maintaining, and expanding waste reduction, recycling, and buying recycled programs.

The DSWS constantly monitors the recycling markets to identify potential opportunities to remove additional materials from the waste stream:

- County residents can bring bulky rigid plastic items to the Montgomery County Shady Grove Processing Facility and Transfer Station for recycling.
- DSWS has also been operating a model food scrap recycling collection demonstration project at the Montgomery County Executive Office Building in Rockville since November 2011. This project, in which pre-consumer food scraps generated in the building's cafeteria are separated for recycling collection, has diverted a total of 45.2 tons of food scraps for commercial composting through the end of FY14.
- DSWS helps to ensure that paint is not wasted or dumped down drains by accepting unused paint and offering it for residents to take or donating it to charities. In FY14, the county gave away 479 gallons of paint through the free paint program. Also, 233 tons of paint was donated.
- DSWS also participates in the "Bikes for the World" program. In FY14 they removed 15 tons of bikes for restoration and shipment to countries worldwide.
- The County Transfer Station has a vendor that accepts Waste Vegetable Oil (WVO) for the sole purpose of bio-diesel production; in FY14, 26 tons of straight vegetable oil was shipped out for processing into biodiesel (http://www.montgomerycountymd.gov/veggieoil)
- The county also gave away 17 tons of usable donated construction materials and 28 tons of books dropped off for donation at the Transfer Station.

Illegal Dumping Enforcement

The County has a call center (311) for non-emergency services where citizens can report incidents involving environmental problems, including illegal dumping. Outside normal business hours citizens can report issues through the MC311 and DEP websites. During FY14, there were 354 complaints concerning the illegal dumping of solid waste, which resulted in the issuance of 10 formal Enforcement Actions (2 Civil Citations with fines totaling $1,000 and 8 NOVs) and numerous Warning Letters. The vast majority of complaints concerned bags of trash, vegetation (leaves and brush), or other unwanted materials either dumped or being stored on private or public property. Only a small percentage of these cases represented a potential for direct runoff of contaminated material into a storm drain or receiving system. Complaint resolution invariably involved removal and proper disposal of trash and debris and proper storage (i.e. under cover) of other materials.

Anti-Litter Enforcement in FY14

The County's Police Force participated in the annual Litter Enforcement Month (April 2014) conducting additional vigilance and community engagement on litter, especially with teens in urban areas.

The Department of Housing and Community Affairs (DHCA) Code Enforcement Division investigates and enforces violations of litter codes on private property. In FY14, they handled 3,615 trash/rubbish related complaints, and issued 408 civil citations. DCHA estimates that 132 tons of trash was removed as a result of their "clean or lien program". DHCA also conducts an Alternative Community Service (ACS) litter removal program, a weekly collection of street debris in targeted neighborhoods, which collected 7,605 bags of trash in FY14.

Carryout Bag Law

From the implementation of the carryout bag fee (January 2012) to June 2014, there have been a total of 146 million bags sold in Montgomery County. Approximately 60 million were sold in FY14, about 5 million non-reusable bags sold per month. According to the Census Bureau, the County population estimate for 2013 is 1,016,667 people. This continues to average out to a little less than five disposable bags bought per county resident each month. In the first month of FY14 the county had 1,108 registered retailers paying the bag fee collected from their business. As of June 2014, there are 1,185 registered retailers in the system. Bag law data analysis to date suggest a slight downward trend, however DEP does not have enough data to definitively report a change in bag usage for the County. Figure III.E.5, below, shows that there has been a steady decline in the number of bags reported per retailer from January 2012 through June 2014.

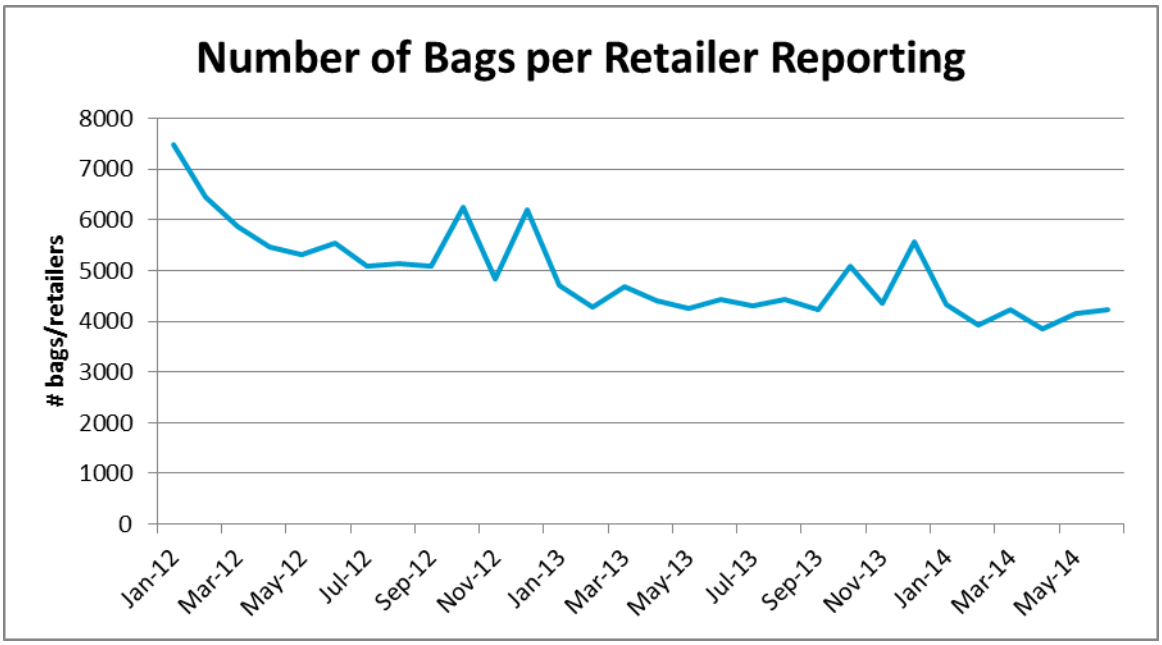


Figure III.E.5. Number of Bags Reported per Retailer Reporting

Increased Litter Removal from County Owned Public Areas

The DGS is responsible for maintaining outdoor public areas and dedicates resources to ensure that adequate litter disposal receptacles are readily available to the public. The DGS works with the County's Regional Service Centers and Urban Districts to strategically place units in the most heavily used areas.

The DGS has also partnered with other agencies, and community groups to enhance placement of litter receptacles, and to pilot advanced technology recycling and litter containers. The Wheaton Urban District, part of the Mid County Regional Service area, with grant funds from the State, added approximately 20 solar powered Big Belly litter and recycling units in the downtown area. Big Belly units compact trash at the point of collection, reducing overflows and allowing for less frequent collection. The units can contain over 150 gallons of trash and are fully enclosed. The Silver Spring Urban District, part of the Silver Spring Regional Service Center area, is also piloting Big Belly litter and recycling units.

The Bethesda Urban Partnership (BUP), the Urban District Corporation for the Bethesda Urban District, owns and maintains hundreds of trash containers in the public ROW throughout the downtown area. The BUP also maintains several recycling containers and has partnered with community groups and local businesses to purchase additional recycling containers.

Transit stops (bus stops) are prime litter hotspots. DOT maintains litter containers at all 500 sheltered bus stop locations, 5 transit centers and other high activity areas around the County. Placement of containers is prioritized based on stop activity, and many of the locations are shared by both the County Ride On Transit System and the Washington Metropolitan Area Transit Authority (WMATA) buses. In FY14, the DOT program to remove trash dumped at transit stops around the County netted a total of 409.03 tons of trash with a budget of $477,000.

Trash Removal from County ROW

The County 311 call center tracks all calls related to litter on County roads, and clean up is handled by DOT. This information is conveyed to the County's Police force in order to increase surveillance of these roadside hotspots.

The DOT's Adopt-A-Road Program supplies 392 community groups who adopt 409 roads (some groups adopt more than one road) with equipment in exchange for their voluntary service of picking up trash and litter along roadways. 171 groups reported 659 clean ups, picking up a total of 2,577 bags of trash in FY14. 157 groups reported 543 clean ups, picking up a total of 2,117 bags of trash in FY13.

Each spring, DOT conducts a roadway litter pick up campaign. In FY14, several teams collected litter along 255 miles of County roads, collecting 430 tons of litter. This program is referred to as *Refresh Montgomery*.

Trash Removal at Stormwater Facilities

The County contracts the removal of organic debris and trash from County maintained SWM facilities. These trash collections are augmented by citizen volunteer clean-ups. In FY14 there were 22 trash collections at 13 different facilities. Four of the 22 collections were performed by volunteers. This is a 49 percent decrease from the 43 total facility cleanings done in FY13. Cleanings are scheduled on an as-needed basis and are related to number of storms that wash in large amounts of trash.

A total of 2,062 pounds of inorganic trash (including aluminum, plastic, and glass containers, plastic bags, tires, styrofoam, paper and miscellaneous items) were removed in FY14. This is an increase of 301 pounds from the amount of inorganic trash removed in FY13. The increased amount of material collected from far fewer cleanings may be a result of several large storms rapidly moving material into the facilities.

In FY14, as shown in Table III.E.8 and Figure III-E.6, by weight 70 percent of the material removed was organic debris (e.g. leaves, twigs, and branches), plastic bottles or miscellaneous items. There was a noticeable increase in the amount of miscellaneous trash collected. This could be partly due to more aggressive collections by volunteers and more accurate record keeping.

Recyclable materials (aluminum, glass and plastic bottles, styrofoam and paper) comprised 69 percent of the inorganic materials found. These materials could easily have been removed from the waste stream through the County's recycling program. Over the past 4 years there has been a clear shift away from glass bottles and a corresponding increase in plastic bottles. In FY14 plastic bottles made up 26 percent by weight of the items collected at the ponds. More pounds of plastic bottles were collected than any of the other categories besides organic debris and miscellaneous trash. Future trash source control efforts will need to focus on additional ways to keep plastic bottles and the other recyclables from entering waterways.

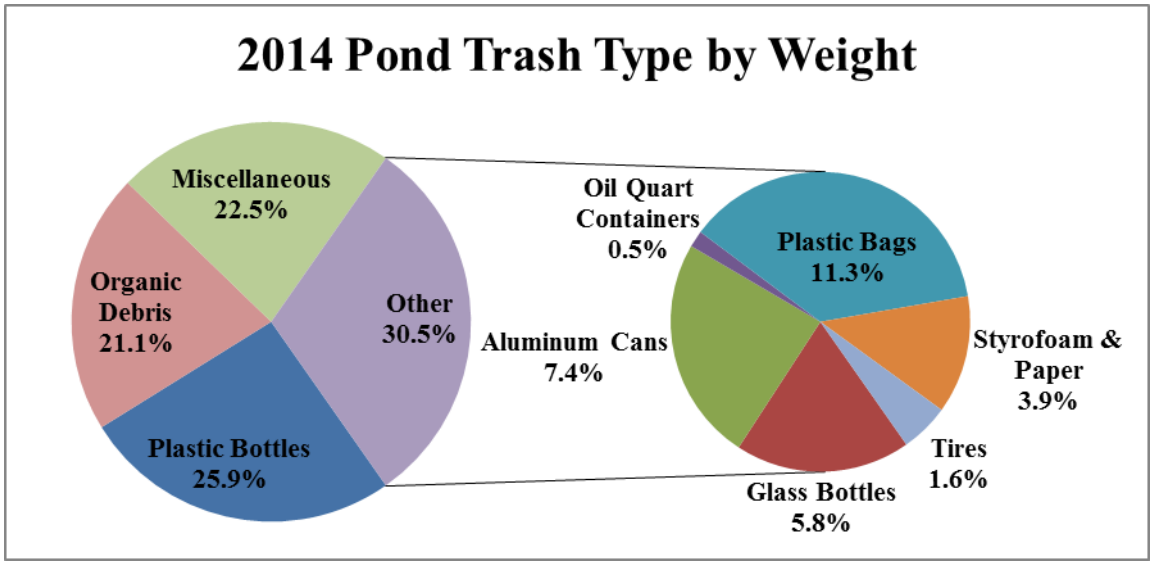


Figure III.E.6. Pond Trash Collected in FY14 by Type

Table III.E.8. Trash Collected From Ponds FY2014 (Pounds)

Date	Ponds Cleaned	Aluminum	Glass bottles	Oil quart containers	Plastic Bags	Plastic Bottles	Styrofoam & Paper	Tires	Organic Debris	Misc	Total
10/19/13	1	31	7			126			370		534
11/8/13	2	19	30	0	29	13	23	0	110	45	269
11/11/13	2	4	4	0	25	25	7	0	0	68	133
11/12/13	1	25	17	4	67	128	14	42	0	17	314
11/13/13	2	14	2	0	10	23	6	0	60	15	131
11/14/13	1	1	6	0	2	2	0	0	0	10	21
11/15/13	2	1	0	0	4	14	1	0	0	10	30
4/15/14	1	4	3	0	25	22	6	0	0	4	64
4/17/14	2	20	34			123				128	305
4/26/14	1	4				24	1			188	217
5/13/14	3	56	41	10	101	137	25	0	6	71	447
5/14/14	3	13	3	0	26	36	14	0	0	21	113
5/15/14	1	1	4	0	7	4	5	0	5	11	37
Total	22	193	151	14	296	676	102	42	551	588	2613
Percent		7.4%	5.8%	0.5%	11.3%	25.9%	3.9%	1.6%	21.1%	22.5%	100%

The Carryout Bag Law which went into effect on January 1, 2012 (FY12) does not appear to be reducing the amount of bags collected at the ponds. As seen on Figure III.E.7, the amount of plastic bags collected was about the same as in FY13. Plastic bags comprised a smaller fraction of the trash collected in prior years.

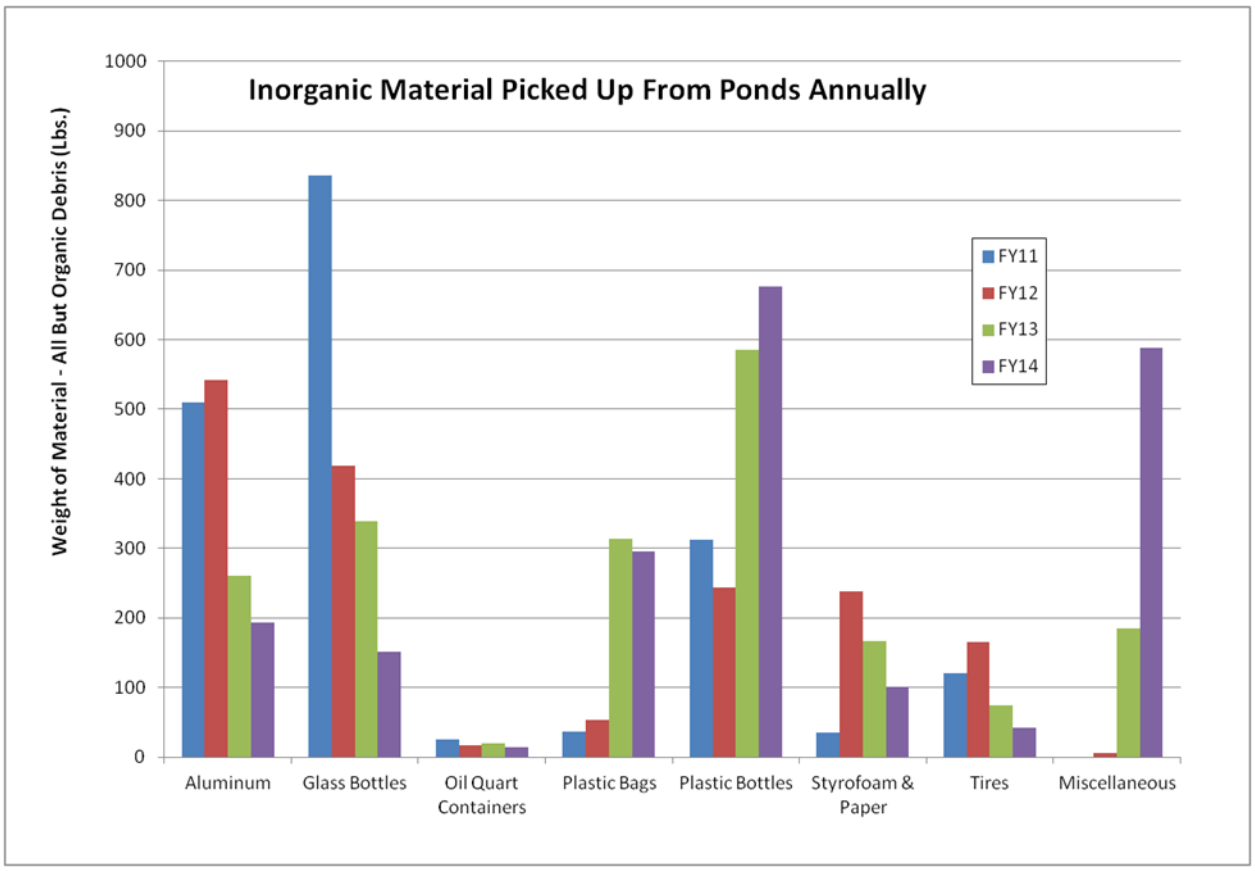


Figure III.E.7. Inorganic Material Removed from the SWM Ponds Annually

Post-Anacostia Trash TMDL Monitoring

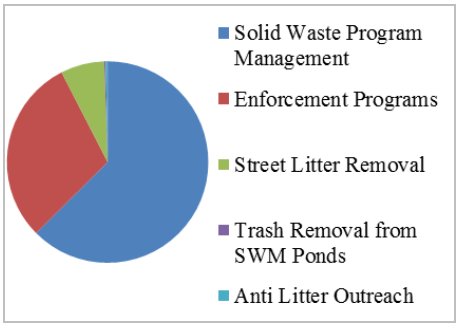
The DEP continues to conduct trash monitoring and assessment in the Anacostia through a contract with the Metropolitan Washington Council of Governments (MWCOG). Monitoring to date includes:

- Completed four cycles of post-TMDL trash monitoring in the Anacostia. The Anacostia tributary monitoring follows the same protocols for stream-level and land-based surveys as those used for trash TMDL development. As of FY14, there is a general decreasing trend for plastic bag, plastic bottle and Styrofoam trash categories.
- Began three additional types of observation surveys within the White Oak neighborhood of Silver Spring (Anacostia watershed) since monitoring results have shown this area to have the highest amounts of litter found in the stream; a bus stop survey, walking survey, and storm drain inlet survey. This data will be used to help analyze and implement future litter control projects that may be tested for effectiveness in this neighborhood and potentially replicated in new areas.

Cost of Trash Reduction Efforts

For FY14, the County invested an estimated $7,204,186 in trash reduction strategies and programs (Table III-E.9).

Table III.E.9. Estimated FY13 Trash Reduction Costs	
Program	FY11 Cost
Solid Waste Management	$4,692,497
Enforcement Programs	$2,000,129
Street Litter Removal	$479,000
Trash Removal from Stormwater Ponds	$11,110
Anti-Litter Outreach	$21,450
Total	$7,204,186



E.5 Property Management

Table III.E.10 lists the County facilities covered under the MDE General Discharge Permit for Storm Water Associated with Industrial Activities (the General Permit). The MDE accepted NOI's for these facilities in August 2014 for coverage until December 31, 2018. MDE's acceptance letters, as well as the most current SWPPP can be found in Appendix H.

For most of the facilities, DGS has the overall responsibility for meeting the requirements of the General Permit, including updates to the facilities' SWPPP. Agencies housed at the facilities are responsible for implementing portions of the SWPPP that relate to their operations, and include: DOT (Division of Highway Services [DHS] and Division of Transit Services [DTS]); DEP (DSWS and WMD); and DGS Fleet Management Division (FMD). Both the FMD and DHS have Program Managers responsible for environmental compliance for their respective operations at these facilities.

Table III.E.10. Inventory and Status of County Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities		
Name Of Facility/ Responsible Agency	Watershed/Acreage	Most Recent Pollution Prevention Inspection and/or Plan (Electronic File included on CD enclosed)
Colesville Highway Maintenance Depot (DOT)	Anacostia/Paint Branch; 11.73 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Damascus Highway Maintenance Depot (DOT)	Potomac/Great Seneca: 1.4 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.

Table III.E.10. Inventory and Status of County Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities		
Name Of Facility/ Responsible Agency	Watershed/Acreage	Most Recent Pollution Prevention Inspection and/or Plan (Electronic File included on CD enclosed)
Gaithersburg: Highway Maintenance Facility (DOT)		NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Gaithersburg: EMTOC (DGS)	Potomac/Rock Creek: 15.1 acres	
Poolesville Highway Maintenance Facility (DOT)	Potomac/Dry Seneca Creek: 4 Acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Seven Locks Automotive Service Center (DGS)	Potomac/Cabin John Creek: 18.86 Acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Bethesda Highway Maintenance Facility, Sign Shop and Signal Shop (DGS)		
Kensington Small Transit Service Maintenance Facility at Nicholson Court	Potomac/Rock Creek: 3.31 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Silver Spring/Brookville Road Highway Maintenance Facility (DOT)	Potomac/Rock Creek: 17.47Acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Silver Spring/Brookville Road Transit Center/ Fleet Maintenance Center (DGS)		
Shady Grove Processing Facility (DEP)	Potomac/Rock Creek: 43 out of 52.5 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Gude Landfill (DEP)	Potomac/Rock Creek: 120 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Oaks Landfill (DEP)	Patuxent/Hawlings River (355 acres) and Potomac/Rock Creek (190 acres)	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.

All County facilities have annual comprehensive stormwater pollution prevention (P2) inspections. They are also inspected monthly or quarterly. In FY14, DGS and DOT managed sites consistently had the following P2 related needs, as shown in Table III.E.11.

Table III.E.11. FY14 Pollution Prevention Needs at County Facilities Covered Under the State General Discharge Permit for Storm Water Associated with Industrial Activities

Pollution Prevention Need	Action Taken
Depot lots need more frequent sweeping.	DGS is now funding routine depot lot sweeping.
More frequent (daily) housekeeping inspections and small spill clean-up.	Facility personnel are trained annually in proper spill clean-up and preventative housekeeping.
Sites need better storage facilities for equipment.	Recommended capital improvements are being evaluated for implementation.
Covered storage areas for loose gravels and similar materials with retaining walls separating each product.	Recommended capital improvements are being evaluated for implementation.
Most sites need to be repaved and resurfaced.	
SWM facilities need more frequent inspection.	Underground SWM facilities at all depots are inspected and cleaned twice annually with additional maintenance as necessary by DEP's SWM Facility Maintenance and Inspection Program.
Improved storage area for waste oil recycling was recommended for the Poolesville Depot.	Covered storage area for the solid waste receiving area is being evaluated. The site is routinely inspected by County contractors.
Parking lot cleaning and inlet protection needed at the Transit area of the Brookville Depot.	The County has a contractor to clean the depot parking lots. The contractor will clean the lots using inlet protection to prevent the wash water from entering the storm drain. New stormwater quality structures are being added to the Transit bus area at the Brookville Depot.
New salt domar was installed at the Poolesville Depot. At time of inspection, domar cover was torn.	Domar cover replaced and re-tightened.

Pollution Prevention at DSWS Facilities

The DEP's DSWS is responsible for meeting the General Permit requirements at the Gude and Oaks Landfills and the Shady Grove Processing Facility. The DSWS Compliance Officer is responsible for ensuring environmental compliance at Solid Waste operational facilities.

The DSWS quarterly P2 inspection reports indicate that the Oaks and Gude Landfills and the Shady Grove Processing Facility are in good shape. Litter is picked up on the sites and along the perimeter fence lines regularly and the landfill berms are well vegetated. The Gude Landfill has a few persistent stormwater depressions and leachate seeps that are repaired promptly. The Shady Grove Processing Facility storm drain inlet screens had some partial blockage from blowing leaf and grinding debris, and were cleaned. Cleaning of three of the stormceptor SWM BMPs were put on a quarterly cleaning schedule (from biannual) to facilitate structure function and sediment removal.

In FY14, DOT, DGS, and DEP continued to deliver yearly training on the General Permit requirements to all facility operation employees. Operation specific training, incorporating annual P2 inspection findings, was delivered at each facility location. Assessments, needs and improvements were covered in this training as well as ways to reduce hazardous substances, pollutants, or contaminants.

In 2008, new CIP funding dedicated to environmental compliance was added to the DGS budget. In FY14, the following environmental compliance CIP initiatives were accomplished:

- As part of the County's Smart Growth Initiative, the Gaithersburg Heavy Equipment Maintenance and Operations Center, Transit Services and Highway Maintenance facility were relocated to the County's EMTOC. The onsite facilities include many pollution prevention and stormwater management upgrades including a new bus wash facility, heavy equipment storage shed, soil/gravel storage area, salt barns, and Highway Services bays.
- SPCC measures Plans were developed for the new County facilities.
- The DGS removed USTs and contaminated soils from the old location of the Gaithersburg Heavy Equipment Maintenance and Operations Center.
- DGS is also currently replacing underground storage tanks with aboveground storage tanks at County Fire Stations.
- Construction of the Silver Spring/Brookville Road Depot stormwater improvements continues, which will add two Baysaver water quality structures, and trench drains to improve the water quality from the transit maintenance facility area. Planned improvements for FY15 include a new permanent structure for bulk storage of highway maintenance materials (topsoil, sand, gravel), and an improved bus stream bay.
- Upgraded oil handling area at the Brookville Depot.
- DGS/DOT has begun routine mechanical sweeping of all the industrial facilities, and increasing the cleaning frequency of facility oil/grit separators. In FY14, all depots were swept.

County Co-Permittees Property Management

Town of Poolesville

The Town of Poolesville is the only one of the six small municipal co-permittees that is required to have a General Permit NOI. The Town of Poolesville has a maintenance yard associated with the Poolesville Wastewater Treatment Plant, with outside truck and materials storage, and maintains a current SWP3 for the site. The Town's Public Works Director is responsible for the SWP3 on this site and conducts weekly inspections to assure compliance. The Town reported no changes for FY14.

MCPS

MCPS runs and operates five industrial sites that require coverage under the Maryland General Permit for Discharges Associated with Industrial facilities, Permit 12-SW. The facilities are listed below in Table III.E.12. All facilities are maintained by the MCPS Department of Facilities Management—Division of Maintenance, and Department of Transportation- Division of Fleet Maintenance. The exception is West Farm, which is managed by the Department of Transportation only. All facilities submitted an NOI for coverage under the current General Permit in FY14.

During FY14, MCPS performed the annual evaluation of the SWPPP and SPCC Plans for all five industrial facilities. Improvements have been implemented at these sites as recommended by the annual inspections. MCPS also maintains 30 underground storage tanks at 15 facilities in compliance with MDE regulations. In FY14, MCPS spent $232,204 on facility pollution prevention.

Table III.E.12. Inventory and Status of MCPS Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities (12-SW)

Name Of Facility/ Responsible Agency	Watershed/Acreage	Status
Bethesda Fleet Maintenance/ Bethesda Facilities Maintenance Depot	Cabin John Creek 6.2 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Randolph Fleet Maintenance/ Randolph Facilities Maintenance	Anacostia 9.3 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
Shady Grove Fleet Maintenance/ Shady Grove Facilities Maintenance	Rock Creek 15 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.
West Farm Transportation Depot	Anacostia River 5.06 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.

Table III.E.12. Inventory and Status of MCPS Facilities Covered under the Maryland General Discharge Permit for Storm Water Associated with Industrial Activities (12-SW)		
Name Of Facility/ Responsible Agency	Watershed/Acreage	Status
Clarksburg Fleet Maintenance/Clarksburg Facilities	Seneca Creek 15.11 acres	NOI accepted for registration under the NPDES General Permit. SWPPP updated in FY14.

MCPS is responsible for training employees in positions that have particular potential for storm water pollution; primarily maintenance and transportation staff. In FY12, an MCPS contractor performed in depth in-house storm water and pollution prevention training for staff in the Facilities Maintenance Division. To date, 72 Fleet Maintenance staff members and 190 from Facilities Maintenance have received such training. In FY14, refresher training was provided to 110 Fleet Maintenance staff. MCPS plans to provide online stormwater awareness training to all MCPS support services staff on a 5-year cycle.

The MCPS has programs in place to reduce the amount of pesticides, herbicides and fertilizers on MCPS property. MCPS implements an IPM program at all schools, centers and facilities, with an emphasis on physical rather than chemical measures for pest control, in accordance with MCPS Regulation ECF-RB, Pesticides Use in Schools. Under Maryland Law, only licensed and registered pest control workers may apply any pesticides or herbicides in a school building or on school grounds (COMAR 15.05.02.10). In addition, only certain products are approved for use in and around MCPS facilities by certified pest applicators and all chemicals used undergo a thorough safety review by professional staff. State law also enumerates specific requirements about the storage, use, signage and notification required for pesticide applications. MCPS IPM staff work with facility occupants to stress the need for proper sanitation measures and structural exclusion to control pests, using pesticides only when all other measures have failed. To have more centralized controls in place over fertilizer and herbicide applications, MCPS has a process to pre-qualify contractors whom perform athletic field maintenance at high school athletic fields in order to. In FY14, MCPS spent $301,100 on IPM and fertilizer management.

The MCPS continues to work with the WSSC's FOG program to reduce and eliminate SSOs that could potentially originate from MCPS sites and negatively impact stream water quality. As part of this process, MCPS has scheduled the installation and clean out of grease interceptors, provided training, and implemented operational BMPs in all school cafeterias.

E.6 Road Maintenance

The Permit requires the County to reduce pollutants associated with roadways by implementing a road maintenance program that includes street sweeping, inlet cleaning, reducing the use of pesticides, herbicides, fertilizers and other pollutants associated with roadway vegetation management, and controlling the overuse of winter weather deicing materials.

Montgomery County Street Sweeping Program

The DOT and DEP oversee a street sweeping program that uses funding from both agencies. In FY14, DOT funded street sweeping on residential routes, and DEP funded arterial route sweeping (arterial routes are larger roads with more commercial activity, traffic and more observed trash). In the past, DOT oversaw all County street sweeping. In FY14, DEP assumed oversight and inspection of the DEP portion of the sweeping program.

The DOT sweeps 56 residential routes shown on Figure III.E.8 at least once per year. Nineteen of these routes have been designated as priority residential routes based on the average tons per curb mile collected, lack of adequate stormwater management, and water quality impairment from sediment. These routes also tend to coincide with areas in the County of the highest annual average daily traffic as shown on Figure III.E.9. Sweeping is scheduled so that the priority residential routes are swept first early in the spring to more effectively recover material applied during winter storms.

The remaining 37 DOT swept routes are considered "non-priority" residential routes, and are generally swept once per year following priority residential route sweeping. Some residential roads in rural areas (western and northern) of the County are not swept. The relatively low amount of vehicle traffic and the lack of curbs in these areas make street sweeping impractical. As in past years, more material was collected per curb mile from the priority routes in FY14.

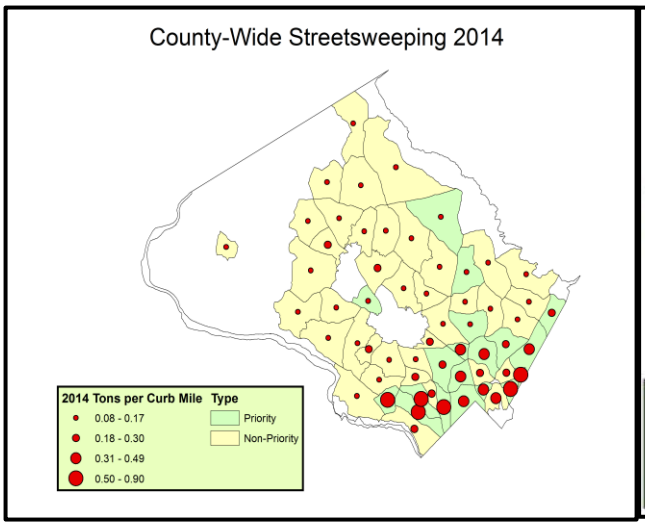


Figure III.E.8. Countywide Street Sweeping

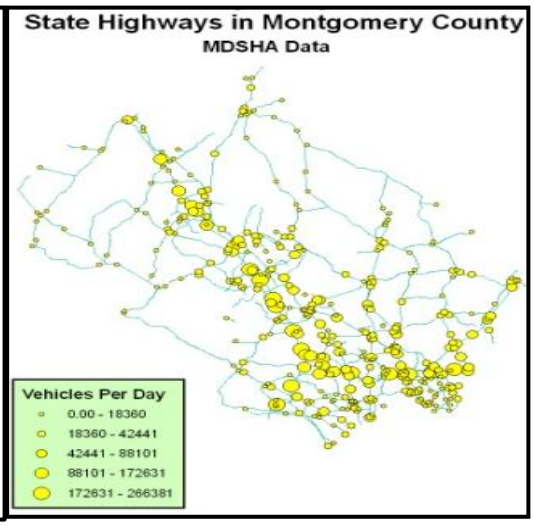


Figure III.E.9. Annual Average Daily Traffic 2010

The DEP funded sweeping of 229 curb miles on arterial routes, shown on Figure III.E.10. The routes are swept at night when traffic volumes are low. Sweeping is only done on segments of the roads without residential housing because of noise considerations. In FY14, DEP swept the arterial routes 19 cycles.

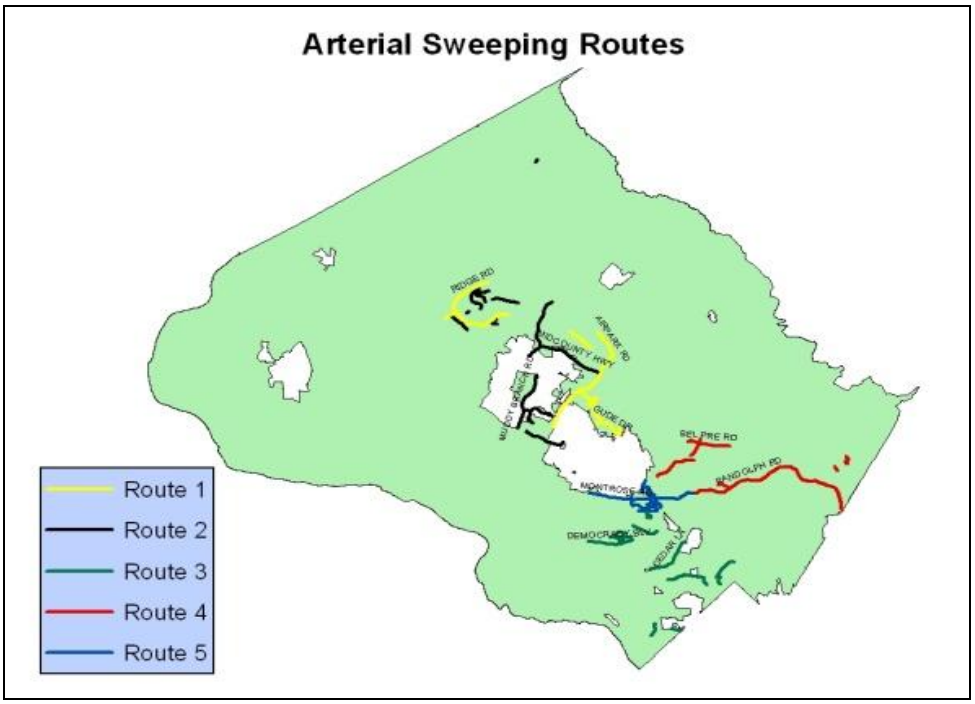


Figure III.E.10. Montgomery County Arterial Street Sweeping Routes

A summary of the County's FY14 street sweeping program is shown in Table III.E.13.

Table III.E.13. Summary of County's FY14 Street Sweeping Program

Category	Materials Removed (tons)	Curb Miles Swept	Tons Material/ Curb Mile	Cost per ton	Cost per curb mile	Total Cost
Priority Residential Routes	543.30	1271.37	0.43	$170.83	$73.00	$92,810.01
Non-Priority Residential Routes	438.15	2784.58	0.16	$463.94	$73.00	$203,274.34
Arterial Routes 19 cycles	406.4	4358.03	0.09	$428.94	$40.00	$174,321.20
Totals	1387.85	8413.98				$470,405.55
County Average Tons Material/Curb Mile			0.16			

Figure III.E.11 shows tons of materials removed annually by street sweeping from 1999 to present. The tons of sand and salt applied were not reported for FY09 and FY10. In 2002, no County street sweeping was conducted due to lack of funding. The amount of material removed

seems related to the amount of sand applied for de-icing, which is related to winter precipitation. More snow and ice increases the need for application of sand to the roads, which then becomes more available for collection during street sweeping. In 2012, DOT stopped mixing sand and salt as a routine practice. DOT now applies a salt brine solution before storms and granular salt to accumulated snow. Sand is still used as a spot treatment and during icy conditions, but the amounts of sand used have declined dramatically. In FY14, 10,000 tons of sand were used with 101,787 tons of salt.

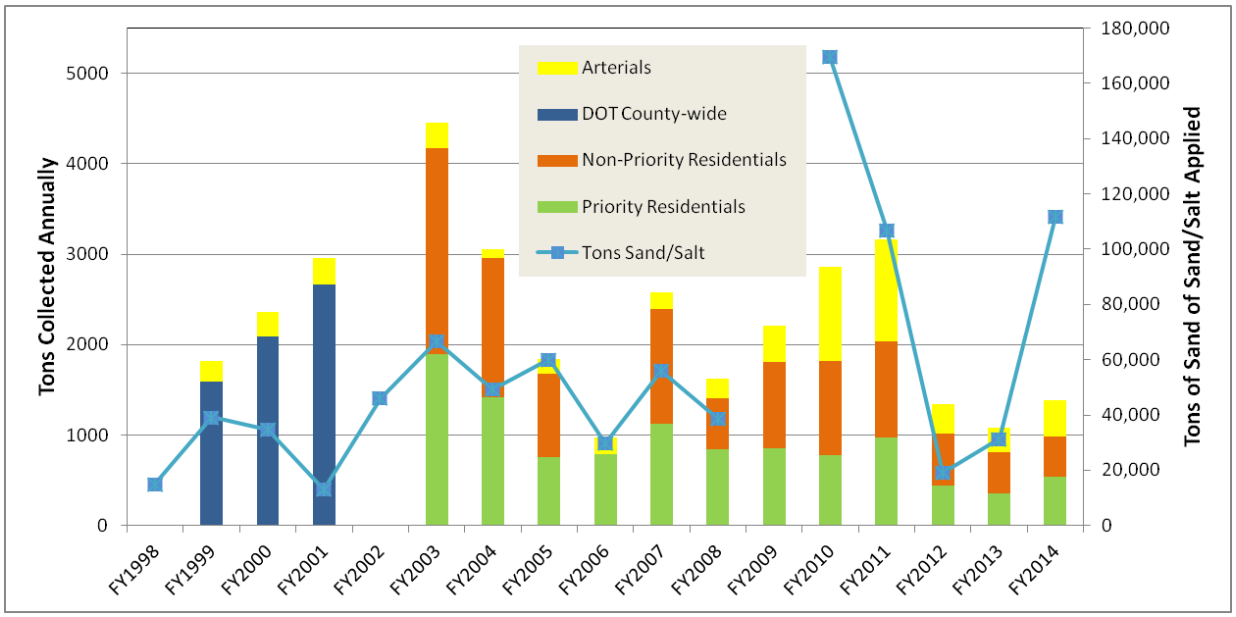


Figure III.E.11. Tons of Material Applied During Winter Activities and Collected by Street Sweeping 1998-2014

Figure III.E.12 below shows the mileage swept per year by route category. More miles were swept in FY14 than any prior year except FY13. Overall average cost per mile remains low as the County continues to emphasize arterial sweeping. (Figure III.E.13).

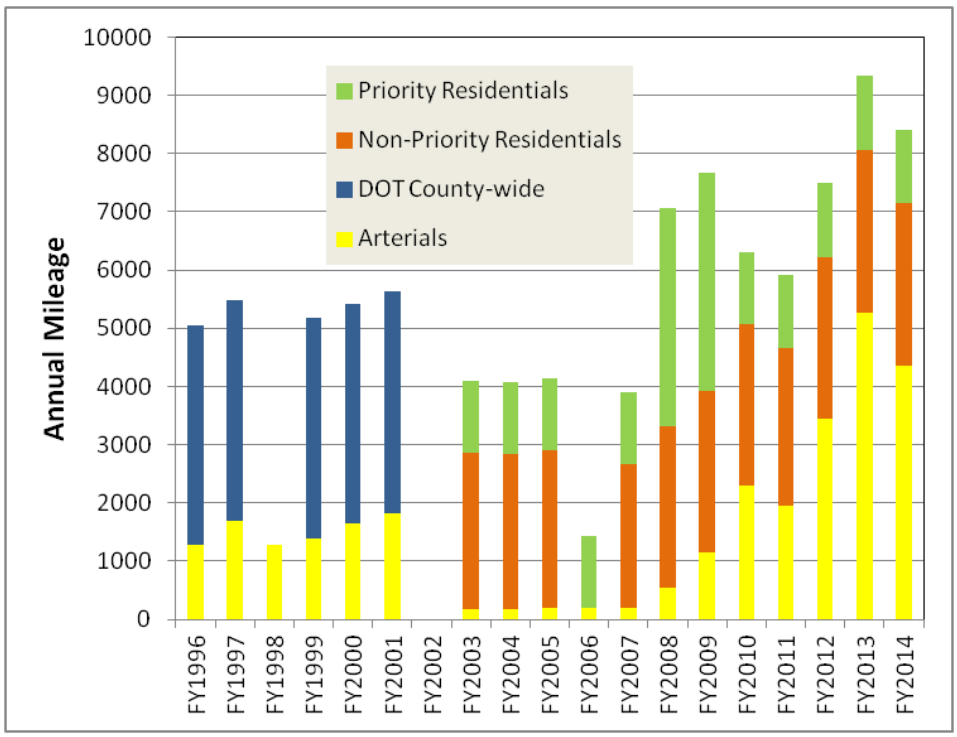


Figure III.E.12. Annual Montgomery County Street Sweeping Mileage 1996-2013

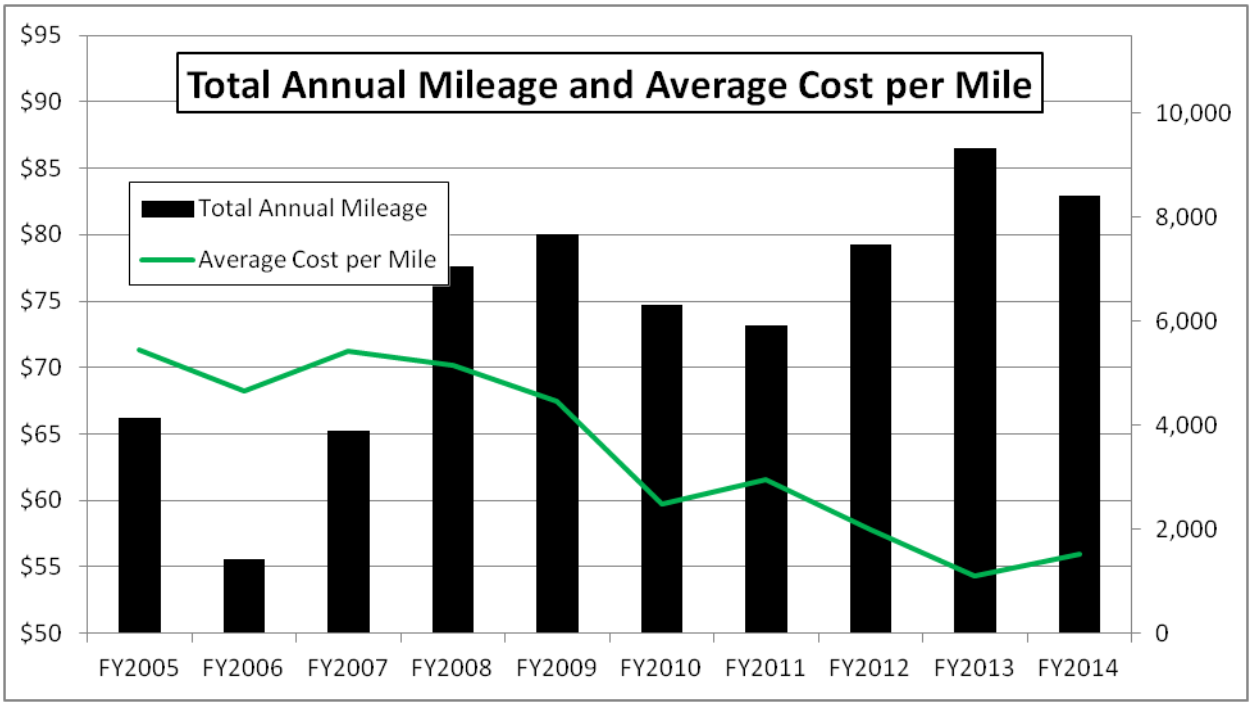


Figure III.E.13. Montgomery County Street Sweeping Mileage and Average Cost 2005-2013

In FY14, DEP decided to update the arterial street sweeping program to identify routes in watersheds with TMDL's. Street sweeping would then be located in areas with water quality impairments that could benefit from additional pollution controls. DEP is assembling a set of arterial routes in the Anacostia and Rock Creek watersheds, which both have TMDLs for sediment and phosphorous. DEP will prioritize roads with high traffic volumes and those serving commercial, industrial or multi-family residential land uses.

Calculating Equivalent Impervious Acreage and Pollutant Reductions for TMDL Watersheds and Countywide

In FY12, the County began sweeping 229 miles of roadway identified as arterial routes twice monthly. Table III.E.14 shows the miles of arterial routes, along with the percent of the total arterial routes, for each watershed. This sweeping frequency allows the County to take credit for stormwater control for impervious acreage equivalent and stormwater pollutant load reductions both Countywide and in applicable 8 digit watersheds with approved TMDLs. The credits were calculated according to MDE's August 2014 Draft Guidance "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*", Table 3.E. Alternative Urban BMPs.

Table III.E.14. Arterial Street Sweeping by Watershed FY14

Arterial Street Sweeping by Watershed							
MD8DIG	Watershed	Miles	Percent of Roadway Swept by Watershed	IA Credit (acres)	TN Removed (lbs)	TP Removed (lbs)	TSS Removed (tons)
02131108	Brighton Dam Reservoir	0.1	0.1%	0.2	0.9	0.4	0.1
02140202	Potomac Direct	28.8	12.5%	20.3	177.8	71.1	10.7
02140205	Anacostia	28.7	12.5%	20.3	177.8	71.1	10.7
02140206	Rock Creek	86.4	37.7%	61.3	536.2	214.5	32.2
02140207	Cabin John Creek	26.9	11.7%	19.0	166.7	66.7	10.0
02140208	Seneca Creek	58.3	25.4%	41.3	361.3	144.5	21.7
02140302	Lower Monocacy	0.1	0.1%	0.2	0.9	0.4	0.1
Grand Total		229.4	100.0%	162.6	1421.7	568.7	85.3

Notes:
Total Amount of Material Collected in Arterial Routes in FY14= 406.4 tons
IA= Impervious Area
TN= Total Nitrogen
TP= Total Phosphorous
TSS= Total Suspended Solids

Inlet Cleaning

Table III.E.15, below, compares the DOT inlet cleaning program for this Permit cycle from 2010-2014. Impervious acres equivalence treated is 86 acres, as calculated using guidance from "*Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*", MDE, August 2014.

Table III.E.15. DOT Inlet Cleaning, by Fiscal Year 2010-2013

Year	# Inlets Cleaned	Linear Ft. Cleaned	Debris Collected (tons)	IA Equivalence Treated	Cost
FY14	648	20,710	217	86	$418,353
FY13	803	15,769	494		$246,200
FY12	811	14,382	367		$275,392
FY11	1,191	17,604	107		$269,593
2010	2,011	24,128	181		Not Reported

Roadside Vegetation Management

Montgomery Weed Control, Inc. conducts the County's State required roadside weed spraying program for noxious weeds. Specialized spray equipment achieves cost efficient control with minimal use of herbicides. Operational (BMPs) are always followed. All personnel employed by Montgomery Weed Control Inc. are pesticide applicators registered and trained in compliance with the State Pesticide Applicator's Law.

Other than for noxious weed control, the County uses no other pesticides, and no fertilizers, for roadside vegetation management. Table III.E.16 shows the amount of herbicides applied along County roadways from 2010-2014.

Table III.E.16. Herbicide Usage by Montgomery Weed Control Inc. on Montgomery County Rights of Way

Purpose	2014	2013	2012	2011	2010
State-mandated Treatment for Noxious Weeds	7.35 Gal Clopyralid 2.58 Gal Glyphosate	4.84 Gal Clopyralid 4.10 Gal Glyphosate	4.78 Gal. Clopyralid 4.55 Gal. Glyphosate	5.20 Gal. Clopyralid 4.55 Gal. Glyphosate	7.53 Gal. Clopyralid 2.57 Gal. Glyphosate
Program Cost	$22,000	$22,765	$22,000	$20,000	Not Available

Note: Herbicide use is directly correlated to growing conditions for each season

Winter Weather Materials Application

The DOT uses plowing and salting to achieve a desired level of winter weather roadway treatment. The DOT follows the October 2011 Maryland State Highway Administration Salt Management Plan. All application equipment is calibrated once a year. In FY11, DOT launched a new on-line system to track the status and progress of roadway treatment and plowing during winter weather events. In FY12, the Snow Tracking Application was revised to include salt used per route to identify trends in salt usage and improve salt use management. In 2012, the DOT discontinued ordering sand for use in de-icing roads. There was a stockpile of approximately 18,000 tons of salt/sand (80 percent-20 percent) that continued to be used until depleted.

In 2009, DOT began a salt brine pilot program on 240 lane miles of primary roads. Salt brine is a 23 percent salt solution created in a brine maker and stored in tanks until used. Brine has a freezing point of -6 degrees F and continues to work when salt, which loses effectiveness at 20 degrees F, does not. A contractor sprays the salt brine on highways 2 hours to 2 days prior to the onset of frozen precipitation to prevent snow and ice from bonding to pavements. In 2010, over 400 lane miles of both primary and secondary roads received salt brine applications using contracted and County equipment. In the 2011-2012 winter seasons, DOT purchased additional salt brine making equipment and storage tanks and developed the salt brine treatment program to include 678 lane miles of primary, secondary and some neighborhood roads. In FY14, DOT sprayed a total of 122,000 gallons to treat 2,034 miles.

Table III.E.17, below, compares DOT's winter weather deicing materials use from FY10-FY14.

Table III.E.17. DOT Winter Weather Deicing Material Usage from FY10-FY13. NR=not Reported

	FY14	FY13	FY12	FY11	FY10
Salt, tons	111,787	31,309	15,200	85,600	169,633 sand and salt combined
Sand, tons	10,000	0	3,800	21,400	
Salt Brine, gallons	121,787	93,005	122,031	NR	NR

E.7 Public Education and Outreach

Compliance Hotline

The Permit requires the County to establish and publicize a compliance hotline for public reporting of spills, illegal dumping and suspected illicit discharges. The County maintains a call center that allows citizens to call one number (311) for all concerns in the County, including surface water quality concerns. More information can be found on the 311 home page at: http://www3.montgomerycountymd.gov/311/Home.aspx

DEP Communications

In FY14, the My Green Montgomery online education portal (www.mygreenmontgomery.org) expanded its outreach efforts with the creation of a monthly newsletter and expanded blog.

Social Media Statistics for DEP

- Facebook "likes" grew from 196 to 305, a 55 percent increase in reach.
- Twitter followers grew from 98 to 415, a 323 percent increase in reach.
- More than 4,422 pictures and videos on Flickr, almost all of them related to water, restoration and outreach.

Newsletters

The My Green Montgomery monthly newsletter grew from 262 recipients to 399, a 52 percent increase in readers.

My Green Montgomery Website

Twenty-one blog articles focused on water issues, including blogs on the storm drain art at the Aspen Hill Library, pet waste education, Stream Stewards and three on the new FrogWatch program. The My Green Montgomery website had more than 10,700 users in FY14 and 3,584 (13.7 percent) unique pageviews were of water-themed content.

DEP Website

The DEP website (www.montgomerycountymd.gov/dep) went through a complete overhaul in January 2014. The website has a new structure with new navigation, content and features. The new site was launched almost exactly halfway through the year, so statistics are divided into two parts as noted in Tables III.E.18 and III.E.19.

Table III.E.18. Full DEP Website Statistics

Old Website (July 2013 – January 2014)	New Website (January 2014 – July 2014)
• 167,495 Unique Users • 550,075 Pageviews • 2.02 Pages per Session • 1 Minute 38 Seconds Average Session Duration	• 164, 498 Unique Users • 553,891 Pageviews* • 2.91 Pages per Session • 1 Minute 48 Seconds Average Session Duration

Table III.E.19. Water Section Statistics

Old Website (July 2013 – January 2014)	New Website (January 2014 – July 2014)
• 60,643 Unique Pageviews • 2 Minute 2 Seconds Average Session Duration	• 9,405 Unique Pageviews* • 1 Minute 38 Seconds Average Session Duration

*The decline in the number of unique pageviews is attributed to the fact that there was a decline in the overall number of water pages as content was consolidated and re-structured.

Public Outreach and Stewardship Work Plan

The Permit requires the County to develop and implement a public outreach and education program focused on stormwater pollution reduction with specific goals and deadlines. To meet this requirement, the County developed a POSWP as part of the County's overall Strategy, submitted to MDE in FY11.

The POSWP outlines eight specific priorities to address many of the Permit outreach requirements in III.E.7.b.i-viii. The priorities include: pet waste management, lawn stewardship, anti-littering, stormwater awareness, establishing a volunteer program, riparian reforestation, roof runoff reduction and parking lot recharge. In the POSWP, each priority is summarized in a practice sheet which identifies performance goals, key messages, intended outcomes, targeted audiences, partnerships to develop, delivery techniques, startup costs, measurement objectives, timelines and milestones from start up through 2025. The POSWP can be found online at http://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/Watershed-Outreach-Plan-2012.pdf.

Summary of Stormwater Outreach Efforts During the Third Generation Permit Cycle

The DEP expanded its outreach and stewardship during this fiscal year and throughout the permit cycle. Outreach and stewardship highlights include:

- Creating a public outreach and stewardship plan in 2010
- Hiring three watershed outreach staff
- General watershed outreach activities increased 745 percent from FY10-FY14
- Overhauling the DEP website to better suit the needs of the public
- Creating a "My Green Montgomery" website as a public interactive website to promote green initiatives and activities.
- Creating additional Outreach programs, including:
  - The Stream Stewards Volunteer Outreach Program
  - A Pet Waste Management Program with homeowners associations
  - A Storm Drain Art Program
  - The Montgomery County FrogWatch USA chapter
  - The H2O Summit annual community event
  - The "Caching the Rain" stormwater awareness geotrail
- Collaboration on a regional anti-litter campaign with the Alice Ferguson Foundation and several other jurisdictions.
- Focused outreach to culturally diverse communities increased, including translations for 22 publications.
- Forty-three new outreach publications were created.
- Achieving a social media presence by creating DEP Facebook, Twitter, Instagram, Flickr and blog accounts including five group listserves and e-newsletters.
- Creating a watershed group capacity building effort which helped eight watershed groups build a stronger organizational structure.

- Two new watershed groups were created since FY10: Muddy Branch Alliance and the Watts Branch Alliance.
- The Water WatchDogs group, started by the Friends of Sligo Creek watershed group as a means to raise public awareness on water pollution and enhance an email alert mechanism for reporting pollution incidents.

In FY14, DEP events focused on targeting audiences, increasing stormwater awareness, encouraging directionally correct measures, and establishing baseline information through surveys. The baseline information will help guide POSWP implementation and follow-up measures. DEP will continue to search for ways to estimate pollutant reductions from behavior change, beyond those documented in the Strategy, or will default to criteria when established by MDE.

The DEP hosted or participated in 140 outreach events in FY14, an increase of 32.9 percent from the previous year. There were 12,639 attendees directly educated as a result of outreach efforts in FY13. This represents a 19 percent increase in face to face efforts from FY13. DEP's presence in the community conducting watershed outreach has increased 770 percent since the program was reinvigorated in FY10. Table III.E.20 represents a summary of stormwater outreach efforts in FY14.

Focused Efforts to Provide Outreach to Culturally Diverse Communities

In 2014, the population in Montgomery County increased 4.6 percent, surpassing the 1 million resident mark. According to the US Census Bureau, 47 percent of the population affiliated themselves as White, non Hispanic. Hispanic and African American populations were both 18 percent, respectively and the Asian population increased to 14.9 percent*. DEP recognizes the need to develop outreach targeted to the County's increasingly diverse demographics. (*http://quickfacts.census.gov/qfd/states/24/24031.html).

In FY14, DEP translated 17 stormwater maintenance fact sheets into Spanish and partnered with Granito de Arena to hold a Rain Barrel Workshop in Spanish for 26 participants during the H2O summit (see the next section for information on the H2O Summit). Granito de Arena is a nonprofit helping the Latino community make the connection between protection of community resources and a better quality of life. For the H2O summit, DEP also provided translation equipment and had translators available for the event activities. DEP also participated in the World of Montgomery Festival, Ama Tu Vida Health festival and the Montgomery County Financial Fitness Fair; events with a large number of participants that speak Spanish as their first language.

Table III.E.20. Stormwater Outreach Efforts in FY14

Volunteer Efforts	
# of Stream Stewards program volunteers	85
# of Stream Stewards program volunteer hours	729.5
# of Biomonitoring interns	5
# of Biomonitoring intern hours (Laboratory and stream monitoring)	1,105.5

Table III.E.20. Stormwater Outreach Efforts in FY14	
Collective dollar value of volunteers to the county	$42,296.75
Public Events	
# of total outreach events hosted or attended	140
# of residents directly reached	12,639
# of participants attending 2014 H2O Summit	490
# of public meetings held	61
# of RainScapes events held	50
# of Stormwater Facilities Maintenance events held	6
Watershed Group Capacity Building	
# of watershed groups working towards official nonprofit status	2
# of watershed groups assisted	7
# of watershed group trainings held (including one on one sessions)	10
Materials	
# of publications produced	33
# of publication copies printed	12,000
# of publications translated	17
# of listserve subscribers (Stormwater maint., Rainscapes & Landscape Professionals)	600 / 2,426 / 644
Media Distribution (gazette readership)	400,000
Communications Including Web/Social Media	
# of e-newsletter subscribers (My Green Montgomery/Stormwater Maintenance/ RainScapes/ RS Landscapers, Stream Stewards)	399 / 831 / 2,523 / 765 / 300
# of Blogs on My Green Montgomery	21
# of Unique Users on www.montgomerycountymd.gov/dep (1st half of FY14)	167,495
# of Unique Users on www.montgomerycountymd.gov/dep (2nd half of FY14)	164,498
# of Pageviews -water section of www.montgomerycountymd.gov/dep (1st half of FY14)	60,643
# of Pageviews -water section of www.montgomerycountymd.gov/dep (2nd half of FY14)	39,405
# of Unique Users on www.mygreenmontgomery.org	10,776

Table III.E.20. Stormwater Outreach Efforts in FY14	
# of Pageviews of water content on www.mygreenmontgomery.org	3,584
# of viewers of County Cable's My Green Montgomery YouTube Videos	801
# of Facebook Likes / Twitter Followers	305 / 415
# of Emails sent to the County on water through online inquiry form (April-June 2014)	55 (19.3% of all emails)

Implementation of Priority Practices

Pet Waste Management Program (POSWP Priority Practice #1)

In FY14, DEP continued to work with three HOAs in the Rock Creek watershed to establish pet waste stations. DEP funded the pilot project for 1 year, after which the HOAs had the ability to take over maintenance of the stations. DEP also provided outreach to the communities on pet waste problems and the importance of reducing stormwater pollution, with an emphasis on local stream health. Each community received regular updates as to how much waste was collected. A total of 1,669 pounds of pet waste was collected at the 7 installed stations during this period. This resulted in the prevention of 17 trillion fecal coliform bacteria from entering the Rock Creek watershed, along with reducing 96 pounds of nitrogen and 13 pounds of phosphorous.

At the end of the 12-month period, each community decided to adopt their pet waste stations. They also participated in a post project survey to determine if the community's habits had changed. As shown on Figure III.E14, the availability of a pet waste station was a positive factor in encouraging residents to pick up their pet's waste, more influential than laws and fines, or knowing that waste pollutes local waters.

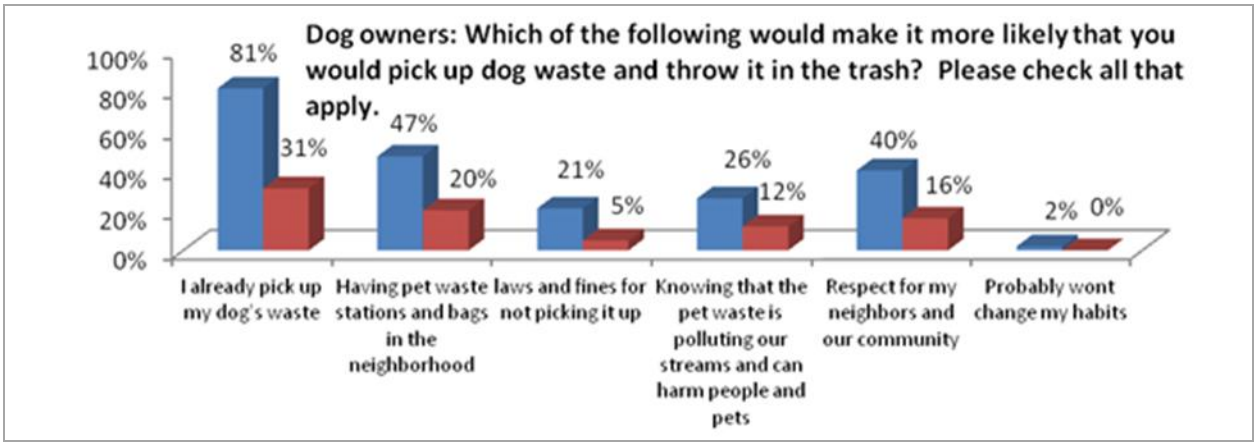


Figure III.E.14. Responses to Post Pet Waste Station Project Survey

DEP staff also created a pet waste pledge that citizens could sign indicating their promise to pick up after their pet. For their pledge, citizens received a portal bag holder that affixes to a leash. In FY14, 275 citizens signed the pet waste pledge.

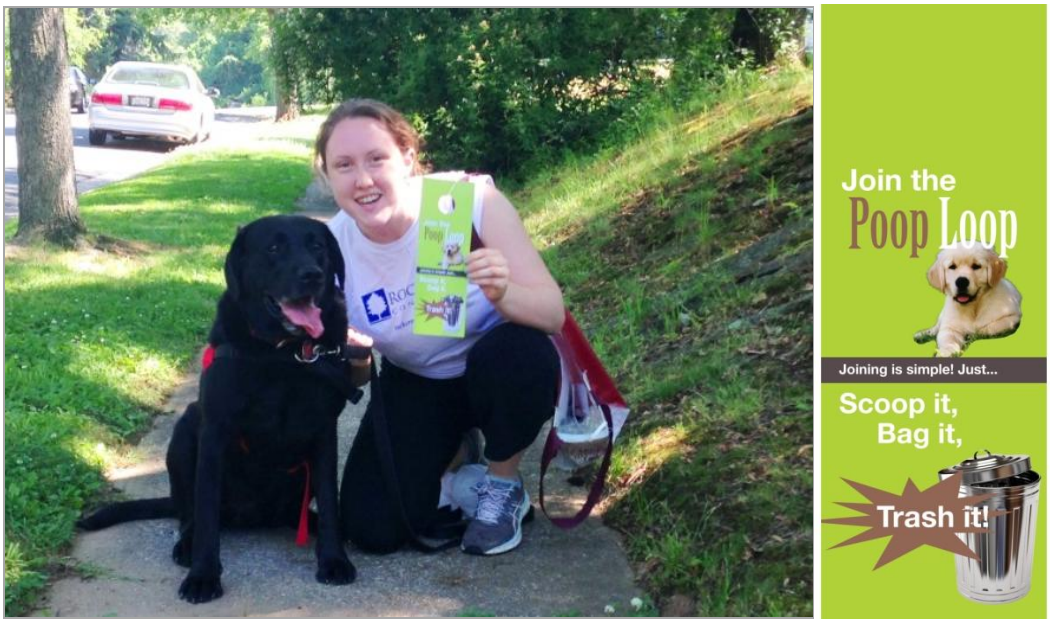


Figure III.E.15. Join the Poop Loop – Taking the Pet Waste Pick Up Pledge

Anti Litter Campaign (POSWP Priority Practice #3)

The DEP's public outreach campaign against litter pollution continued to be a priority in FY14. In FY13, regional Alice Ferguson Foundation (AFF) anti-litter ads were placed on the outside of County Ride On buses and at bus shelters. Many ads remained in place for FY14. The County also added AFF anti-litter ads to the entire fleet of County recycling trucks (125 trucks) and on the inside of Ride On buses.

In FY13, DEP identified an area in the White Oak neighborhood of Silver Spring with high amounts of litter for an anti-litter awareness outreach pilot program and conducted community outreach and an Earth Day clean up event. In FY14, DEP staff worked with the MWCOG to conduct surveys of the area's apartment complexes and shopping centers to better understand factors contributing to the litter issues and establish baseline information. The voluntary survey included questions on property management activities related to littering and attempted to identify specific trends that could be better addressed. DEP contacted 61 multi-family and 16 commercial property managers to request participation. The survey rate of return for the multi-family properties and commercial properties was 38 percent and 31 percent respectively.

Stream Stewards Outreach and Stewardship Campaign (POSWP Priority Practice #5)

These are programs to create champions for neighborhood streams and to increase involvement of local residents and businesses in protecting those streams.

Stream Stewards Volunteer Program

In FY14, the Stream Stewards program continued to train citizen volunteers to help DEP expand watershed outreach to the community. DEP trained 85 volunteers during four orientation sessions, a 63.5 percent increase from volunteers trained in FY13. Volunteers donated 729.5 hours through the program, a 70 percent increase from FY13. Forty percent more individuals signed up to receive the Stream Stewards e-newsletter as well. Finally, the volunteers participated in 13 events and collected 1,075.75 pounds of trash. Results from the program are shown in Table III.E.21.

Table III.E.21. Stream Stewards Volunteer Activities FY14

Volunteer Opportunity	Number of Hours	Number of Volunteers	Service Value
Office Assistance	17.5	1	$403.38
Orientation	59.5	30	$1,371.48
Watershed Ambassador	306.5	60	$7,064.83
Watershed Keeper	346	126	$7,975.30
Watershed Speaker			$
Total	**729.5**	**85***	**$16,814.98**
Total Events in FY14		**13 events**	
Total Pounds of Trash Collected		**1075.75 lbs**	

**Total number of volunteers, not total times a volunteer participated, some volunteers participate multiple times.*

**Service value per Independent Sector (http://www.independentsector.org/volunteer_time)*

Watershed Management Interns

The DEP Biological Monitoring Section conducts detailed biological, chemical, and physical assessments of County watersheds on a 5-year rotating basis (see III.F. Watershed Assessment). DEP recruits and trains volunteer interns each year to assist with the monitoring and laboratory analysis. In FY14, five volunteers donated a total of 1,105.5 hours to the program helping staff to analyze and monitoring water quality and area resource conditions in the County.

In FY14, DEP hosted a Conservation Corps intern from the Chesapeake Bay Trust (CBT). Paid through a CBT stipend of $15,500, the intern assisted with DEP programs and also led the creation of two new programs: The Montgomery County Chapter of FrogWatch and a stormwater awareness geotrail entitled, “Caching the Rain”. Details of these programs are described below under the section titled “New Outreach Programs”. The Conservation Corps intern provided 1,653.75 hours in FY14.

Watershed Group Capacity Building

The DEP works with County watershed groups to develop increased organizational capacity, fostering sustainable local groups that can provide additional outreach to their communities on stormwater pollution prevention, education programming, and fostering behavior change in the County.

Representatives of six County watershed groups attended a strategic planning session held in November 2013. Ninety-three percent of the attendees rated the training as effective or highly effective. After the training, the groups stated that their knowledge of strategic planning increased and that their Board of Directors also increased participation in planning efforts. From July 2013 to January 2104, DEP employed a professional strategic planning consultant to assist the local groups in plan development. During this time, four groups developed draft annual work plans and two developed draft strategic plans.

For the 3rd year, DEP provided funding for one representative from each watershed group to attend the annual Chesapeake Watershed Forum (CWF) sponsored by the Alliance for the Chesapeake Bay. The CWF sessions provided information on grass roots approaches for watershed outreach and implementation. After the CWF, the attendees provided feedback to the County on enhancing future capacity building assistance efforts. The groups emphasized the importance of DEP provided scholarships for forum attendance.

In February 2014, DEP drafted a technical report describing the capacity building process and results since the project began in July 2011. Table III.E.22 shows accomplishments in FY14. The final project report can be viewed at: https://www.montgomerycountymd.gov/DEP/Resources/Files/ReportsandPublications/Water/Countywide%20Implementation%20Strategy/H2O-Group-Capacity-Building-Factsheet.pdf

Table III.E.22. County Watershed Group Capacity Building Accomplishments in FY14

Watershed Group Capacity Building	
Activity	#
Trainings held	1
One on One Sessions	9
Part-time executive director hired	1
Strategic Plans developed	2
Draft annual workplans developed	4

Watershed Group Accomplishments

During FY14, eight watershed groups actively recruited members and conducted special activities including roadway and watershed clean-ups, and invasive plant work days. These groups include the Friends of Sligo Creek, the Neighbors of Northwest Branch, the Rock Creek Conservancy, the Little Falls Watershed Alliance, the Friends of Cabin John Creek, the Muddy Branch Alliance, the Seneca Creek Watershed Partners and the Watts Branch Alliance.

The DEP continued its focus on tracking litter removal and community outreach by the watershed groups. In FY14, however, DEP received a report documenting FY14 accomplishments from only the Rock Creek Conservancy. DEP notes that activities from all the groups have noticeably increased over the past year even though reports were not received.

Rock Creek Conservancy

The Rock Creek Conservancy worked with DEP on two projects in FY14: Storm Drain Art (described below) and the Pet Waste pilot (described previously). They also individually completed the following activities in their watershed:

- Hosted 8 educational events
- Engaged 137 volunteers who donated 266 service hours
- Participated in stream cleanups through the Stream Team program (results are reported by M-NCPPC)
- Increased their members to 1200 individuals
- Collected 175 bags of trash and recyclables

H2O Summit

"I learn something great every year and network more and more. I appreciate the time and effort to share this knowledge. Thank you for doing this event!" – 2014 H2O Summit attendee

The 4th annual H2O Summit was held in FY14, and had 490 attendees; the event's largest number to date. The event is composed of family friendly festival and workshop components that focus on water resource related topics including stream health, stormwater pollution and litter reduction. The festival portion of the event drew the largest number of attendees.

DEP conducted a survey of the attendees, and found that most attended the Summit to expand their environmental knowledge, to network and because they had an interest in stormwater management. A total of 67 exhibitors participated in the Summit (an increase of 11.6 percent from FY13). 117 of the 174 event registrants filled out a pre-survey (67 percent rate of return). Post surveys were sent out to 140 attendees, and 33.6 percent were returned. Table III.E.23 summarizes participant survey responses. Figures III.E.16-19 show pictures from the event.

Table III.E.23. FY14 H2O Summit Survey Responses	
2014 H2O Summit	
Total Attendance	490
Reason for attending	Expand Environmental knowledge, Networking, Interest in Stormwater Management
Collective Workshop ratings	8.85 out of 10
Likelihood of attending future events	97.4%
DEP's effectiveness rating of protecting the County's water resources	7 out of 10
Household pollution habits (117)	Recycling (32%), Not applying fertilizers/ pesticides (28%), Not littering/picking up litter (28%)
Registered attendees average age (174)	43.4 years

Figure III.E.16. Eric Naibert, DEP Biologist, and Virginia Vassalotti, Chesapeake Bay Trust Conservation Corps Volunteer, Assisting at the 2014 H2O Summit

Figure III.E.17. DEP Chief Operating Officer, Kathleen Boucher, Presenting Kay Fulcomer with a Volunteer Excellence Award

Figure III.E.18. Stream Steward Volunteers Assisting at the 2014 H2O Summit

Figure III.E.19. Attendees Learning About Stormwater Flows from an H2O Summit Exhibitor

New Outreach Programs FY14

Innovative Stormwater Management Outreach and Stewardship (POSWP Priority Practice #4)

Caching the Rain

The "Caching the Rain" trail is a scavenger hunt geocaching activity with a stormwater pollution outreach focus. DEP set up geocaches at six locations primarily in the down county area near SWM facilities. Participants must answer stormwater related trivia questions at each station and verify their answers in a survey once they complete the trail. DEP launched the pilot program on June 28, 2014. Experience geocachers provided initial positive feedback after a trial run but more complete results will be available for the FY15 Permit Annual report. Photos of the activity can be found on Figures III.E.20-21.

Figure III.E.20. Sample Passport Question from the Aspen Hill Library Bioretention Facility

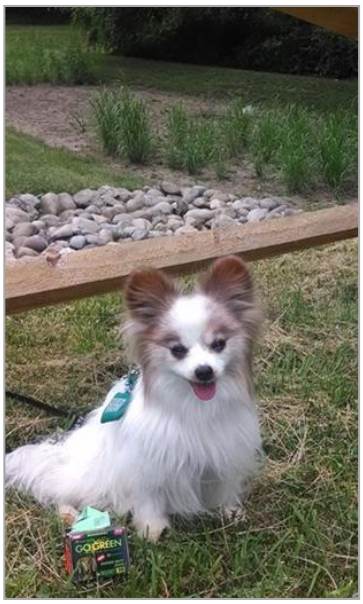


Figure III.E.21. "Slidin' Down Sligo Geocache Site" Focused on Proper Pet Waste Management

Storm Drain Art (POSWP Priority Practices #4 and 5)

This project combined innovative outreach with volunteer engagement to raise stormwater pollution awareness and effect behavior change. In FY14, DEP and Stream Steward volunteers initiated a storm drain art pilot project with the Rock Creek Conservancy. The group installed art at three storm drains in front of the Aspen Hill Library on April 22, 2014. The three projects focused on different aspects of stormwater pollution (Figures III.E.22-25):

- "My water is your water" in English and Spanish
- Pet Waste
- "Drains to Rock Creek"

DEP worked with County Library staff to announce the art project. DEP conducted a public survey on the project in FY15 with results available in the FY15 Annual report.

Figure III.E.22. Storm Drain Art in Spanish

Figure III.E.23. Storm Drain Art in Progress

Figure III.E.24. Storm Drain Art – Drains to Rock Creek

Figure III.E.25. Storm Drain Art Highlighting the Issue of Pet Waste. "Protect Rock Creek, Scoop the Poop"

Frogwatch (POSWP Priority Practices #4 and 5)

The County established a local chapter of the national Frogwatch program in February 2014. 42 people attended two indoor trainings, and 23 people attended two field trainings. 26 individuals signed up to monitor sites in FY14 including several SWM facilities. Volunteers learn to identify frog and toad calls, adopt specific sites for monitoring, and then record calls heard on a weekly basis from March through the summer.

There were 103 total frog and toad observations in the County's first official year of the program. These observations can help DEP Biological Monitoring Section staff determine population trends and inform conservation decisions during planning of SWM facility retrofits.

Water WatchDogs Program: POSWP Priority Practice #4 and 5

Water WatchDogs is a partnership between a Sligo Creek neighborhood group, the FOSC watershed group, and DEP's environmental enforcement section. During FY13, the

partnership developed an email alert mechanism for reporting water pollution incidents discovered by the community. FOSC keeps track of the pollution reports that result from the email alerts, and relays information to the community through their Action Log blogging system. Three volunteers administer the program, including advertising though community presentations and trainings. The program is featured on the FOSC website as an Action Log (which includes a new webpage specific to the program, http://www.fosc.org/AL-WaterWatchDog.htm). The Montgomery County Civic Federation awarded FOSC the Community Hero Award. Winners of the award also recognized DEP's contribution to the program's success.

Stormwater Management Maintenance and Inspection Program Outreach

In FY14, the DEP SWM Facility Maintenance and Inspection Program created multiple publications and hosted several presentations to promote understanding and awareness of the County's program. Most fact sheets are two pages and contain information on the importance of keeping SWM facilities maintained, actions the public can take to keep facilities in proper working condition and where to go for additional information. The fact sheets specifically address structural and non structural maintenance for many of the practices. The fact sheets are available on DEP's website at http://www.montgomerycountymd.gov/DEP/water/stormwater-facilities.html.

Also in FY14:

- DEP distributed BMP maintenance newsletters to over 600 subscribers. The newsletter included helpful seasonal tips on SWM facility maintenance.
- For stormwater professionals, DEP conducted two trainings for contractors and one training for DEP's ESD maintenance contractor. These trainings focused on the procedures and requirements for performing maintenance on stormwater facilities in Montgomery County.
- DEP SWM Facility Maintenance and Inspection Program partnered with the DEP WMD Outreach group to involve residents in the clean-up of storm water ponds. The residents received education about the SWM Facility Maintenance and Inspection Program and the importance of SWM measures throughout the county.

RainScapes Program Outreach

The DEP's RainScapes program promotes and implements environmentally friendly landscaping and small scale stormwater control and infiltration projects on residential, institutional, and commercial properties. DEP developed the multi-strand program, which is designed to provide information and training to residents and landscape professionals, as well as incentives and project delivery to County sites. For more information on the incentive programs; RainScapes Rewards and RainScapes neighborhoods, please see Part III.G.

RainScapes for Schools and the RainScapes for Schools Growing program entered its 5th year in FY14. Since inception in FY10, the Growing program has provided native plants, soil, pots and educational materials to MCPS high school horticulture classes to support instruction on the use of plants in stormwater management. This program has actively supported and influenced the direction of the new MCPS Environmental Horticulture Program, which now includes storm water management as part of their horticulture curriculum. Plants from the program have been used in community based projects and in RainScapes classes as take home materials. In spring FY14, nearly 1000 plants were used as replacement plantings in DEP Green Streets projects.

RainScapes for Schools projects have included both conservation landscapes and rain gardens for curriculum support and runoff reduction (Figure III.E26). Some schools have done more than one project; since 2008, the RainScapes program has supported 15 Montgomery County public school based projects.

Figure III.E.26. RainScapes for Schools Conservation Landscape Garden Filtering Water Before it Enters the Storm Drain System at Montgomery Blair High School

In FY14, DEP continued to train local designers and contractors on RainScapes project requirements and installation, including drainage site assessment, and rain garden design. In addition, DEP provided training in cooperation with the Landscape Technology Program of Montgomery College, and at conferences in Maryland, Pennsylvania, West Virginia and Massachusetts. RainScapes program staff also trained several municipal level staff members and their non-profit partners charged with starting up similar incentive based programs for their MS4 permits. Materials, including technical information, inspection documents, process details and formats, lessons learned were shared freely with several Maryland jurisdictions that requested such collaboration.

In FY14, the DEP RainScapes team provided 40 outreach presentations to community groups, reaching 1300 outside of the scope of hands-on intensive workshops. The team continued to provide hands-on workshops focused on RainScapes Rewards Rebate qualified practices. From 2008-2014, these hands on workshops have reached 1680 residents, averaging 240 participants each year. In addition to presentations and workshops, in FY14, RainScapes developed RainScapes grant criteria for the new DEP Watershed Outreach Grant program and anticipate using this mechanism to expand partnership efforts with local watershed and environmental

groups to benefit the RainScapes Neighborhoods, RainScapes for Schools and RainScapes Rewards components of the program.

For FY15 and FY16, DEP is developing customized outreach approaches to communities defined by a specific focus such as faith based organizations, civic associations, home owner associations, private pools and the commercial sector. The approaches will include creation and translation of materials specific to the focused group, including best use of social media and other modes of information sharing.

FY14 Highlights of RainScapes Outreach include:

- Provided outreach and education materials to over 1300 residents, business owners, and stakeholders at 43 local and regional events as well as staffing the DEP booth at the Montgomery County Fair.
- Offered three workshops on Rain Gardens, Rain Barrels, and Conservation Landscapes to County residents.
- Initiated joint training with DEP Stormwater Facility Maintenance and Inspection Program with the Montgomery College Landscape Technology Program.
- Provided advanced storm water training for Master Gardeners at the state level.
- Partnered with the Tower Company and MCPS to create a pollinator and conservation landscape garden project at a local middle school.
- Developed a professionally oriented template on Rain Gardens and published on DEP's website. This 66 page illustrated guide provides detailed construction and planting plan guidance for design and installation of rain gardens in the County.
- Conducted a marketing study to inform decisions regarding effective messaging and outreach strategies.
- Accelerated the pace of site assessment, design and installation for RainScapes Neighborhoods areas in the County, increasing the total number of installed projects on residential lots using the Neighborhoods approach by a third in 1-year — from 38 to 51.
- Presented to regional level conferences and shared RainScapes program materials with four other counties in Maryland, as well as provided guidance and review of incentive programs.
- Application numbers jumped in FY14, suggesting effective outreach efforts. Figure III.E.27 shows the increase in RainScapes Reward Projects over the past 6 years.

Figure III.E.27. Number of RainScape Reward Projects Submitted over the Past 6 Years

F. Watershed Assessment

As required by the Permit, DEP continues to develop watershed assessments by evaluating current water quality and identifying and ranking structural, non-structural and programmatic watershed restoration opportunities for each County watershed. Full watershed assessments include field investigations, prioritized project (action) inventories with structural and non-structural project concepts, and cost estimates. Watershed implementation plans include results from the watershed assessments, and present more detailed implementation planning and schedules to meet regulatory and programmatic targets.

The Strategy was developed from implementation plans or pre-assessments for each of the County's 8-digit watershed groupings. These are shown in Table III.F1. The final version of the Strategy can be found online at:
http://www.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/wris.asp#plans

Implementations plans were developed for those watersheds with existing EPA approved TMDLs in 2009, and also for watersheds where existing assessments and project inventories had been previously compiled (Muddy and Watts Branch). These plans identify BMPs, quantify treatment by those practices, determine the watershed restoration potential, evaluate the ability of the watersheds to meet applicable TMDLs, and provide schedules and cost estimates. More information on implementation plan development for EPA approved TMDLs is shown in Part III. J. Total Maximum Daily Loads.

The status and schedule of watershed restoration planning is shown in Table III.F2. As shown in Table III.G.10, in Part III.G. Watershed Restoration, DEP budgeted $749,130 in FY11, $502,244.23in FY12, $879,435 in FY13, and $1,658,518 in FY14 for watershed assessment and planning.

Table III.F1. Montgomery County Watershed Groupings and Plans Found in the Strategy		
	Implementation Plan	Pre-Assessment
Watershed Grouping		
Anacostia	X	
Rock Creek	X	
Cabin John Creek	X	
Seneca Creek		
Great Seneca (including Clopper Lake)	X	
Dry Seneca and Little Seneca		X
Lower Monocacy	X	
Upper Potomac Direct (West of Seneca Creek, not described in any other grouping)		X
Lower Potomac Direct (East of Seneca Creek, not described in any other grouping)		
Muddy Branch and Watts Branch	X	
All other subwatersheds		X
Patuxent (Triadelphia/Brighton Dam and Rocky Gorge)	X	

Table III.F2. Status of Montgomery County Watersheds' Assessments		
8 Digit Watershed	Watershed Assessment Status	TMDLs (Issue Date)
Anacostia	Anacostia Watershed Restoration Plan (ARP)(2010) Strategy WIP (2011) PCB WIP (2012)	Bacteria (2007) Sediment (2007) Nitrogen (2008) Phosphorous (2008) Trash (2010) PCB (2011)
Rock Creek	Strategy WIP (2011)	Bacteria (2007) Sediment (2011) Phosphorous (2013)
Cabin John Creek	Strategy WIP (2011)	Bacteria (2002) Sediment (2011)

Table III.F2. Status of Montgomery County Watersheds' Assessments		
8 Digit Watershed	Watershed Assessment Status	TMDLs (Issue Date)
Seneca Creek	Strategy WIP (2011)- Completed for Great Seneca Subwatershed, including Clopper Lake	Clopper Lake : Phosphorus and Sediment (2002)
	WIP Completed FY14	Sediment (2009)
Lower Monocacy	Updated WIP Completed FY14	Sediment (2009) Bacteria (2009) Phosphorus (2013)
Potomac Direct	WIP Completed FY14	Sediment (2011)
Patuxent- Rocky Gorge and Tridelphia Reservoirs	WIP Complete FY14	Rocky Gorge-Phosphorous (2008) Tridelphia-Phosphorous (2008) Tridelphia- Sediment (2008)

Status of Watershed Assessments

In FY14, DEP developed complete watershed implementation plans for two 8 digit watersheds not fully addressed in the Strategy; the Seneca Creek watershed, and Potomac Direct watershed. DEP also developed updated WIPs for the Lower Monocacy and Patuxent Watersheds (Rocky Gorge Reservoir and Tridelphia Reservoir). The WIPs include data review, field assessments, and project inventories for potential restoration projects. The Lower Monocracy, Seneca, and Potomac Direct WIPs include timelines and schedules to meet the WLAs of TMDLs approved subsequent to Strategy development in 2009. Final watershed assessment reports were completed October 2014. The four new WIPS are included in Appendix I in the CD attachment to this report. More information on the WIPs, including timelines showing pollutant reductions to meet the TMDL WLAs can be found in Section J, TMDLs.

Great Seneca and Muddy Branch Watersheds Study

During 2004, the County began the watershed inventories in the Great Seneca and Muddy Branch watersheds as cooperative efforts with the USACE, the City of Gaithersburg, and MNCPPC. These areas represent roughly one-third of the total County land area and include drainage from the densely developed areas of Gaithersburg and Germantown. The study was to be completed by FY13, but is delayed indefinitely due to limited Federal funding. Projects identified in the study are included in the new Seneca WIP, and in DEP's project planning.

Anacostia River Watershed Restoration Plan (ARP) (February 2010)

The final report for the inter-jurisdictional restoration of the Anacostia, *Anacostia River Watershed Restoration Plan and Report*, was completed in February 2010 (http://www.anacostia.net/plan.html). Currently, DEP is conducting an ecosystem restoration feasibility study with the USACE to develop stream restoration design concepts for 9.6 miles of streams identified in the ARP. After the concepts are developed and the feasibility study is complete in Fiscal Year 2016, the study recommendations will be submitted for future USACE

funding authorization to finalize designs for future construction. These selected projects contribute towards reducing future WLAs and accounting towards the County impervious area restoration goal.

Watershed Screening

The DEP Biological Monitoring Group monitors water chemistry, biological community, and stream habitat conditions at representative stations in all County watersheds on a rotating basis over a 5-year cycle. The DEP then develops a multi-metric Index of Biological Integrity (IBI) to develop narrative ratings of biological conditions in the water bodies. A benthic IBI (BIBI) is calculated using benthic macroinvertebrate (aquatic insects) sampling results. A fish IBI (FIBI) is calculated using fish sampling results. For the purposes of this report, a combined IBI for benthic insects and fish is used for second, third and fourth order streams. The combined IBI score is converted to a percentage such that 100 percent is the highest possible score. For first order streams the only the BIBI is used. Biological conditions in the water bodies are then described as excellent, good, fair, and poor, based on distributing the calculated IBI scores by quartiles; the highest 25 percent scores are 'excellent' while the lowest 25 percent scores are 'poor'.

The County categorizes the monitored subwatersheds as impaired or unimpaired by analyzing and comparing the BIBIs, FIBIs and habitat condition scores. BIBIs based on benthic insects (BIBIs) only are used in smaller drainage areas of less than 300 acres. The small streams in these subwatersheds typically support pioneering fish species only, which, because of their adaptability to changing habitat and flow conditions, are not reliable indicators for rating impairments.

In 2013, DEP monitored 30 stations in the Great Seneca watershed for fish and/or benthic macroinvertebrates. Many of the stations have been monitored every 5 years since 1997-1998 which allows DEP to track cumulative changes in stream conditions.

The Great Seneca subwatershed is the largest of those in the Seneca Creek watershed, which is the largest of the eight major watersheds in Montgomery County. The Great Seneca subwatershed represents approximately 72 square miles out of the total 130 square miles of the Seneca Creek watershed. The headwaters of the subwatershed begin in the Damascus area and include the Damascus Wastewater Treatment Plant in the Magruder Branch subwatershed. As Great Seneca flows south, the land becomes increasingly more urban. Drainage is received from sections of Gaithersburg and Germantown. The land use changes back to low-density residential and active agricultural near Riffle Ford Road. The impervious cover for the subwatershed is 12 percent.

Figure III.F.1 compares the stream conditions in the Great Seneca subwatershed for 1997-98 and 2013. The Great Seneca subwatershed is composed of three smaller subwatersheds; the Upper , Lower and Middle Great Seneca subwatersheds. Lower Great Seneca stream stations were generally located in more urban areas while Upper Great Seneca stream stations were generally in low-density residential or agricultural areas. Fourteen stations monitored had a change in stream condition between 1997-98 and 2013. Seven stations showed improvement, four stations showed a decline and three were variable between monitoring rounds. More detailed comparisons of results within the Upper, Middle, and Lowers Great Seneca are presented in separate sections.

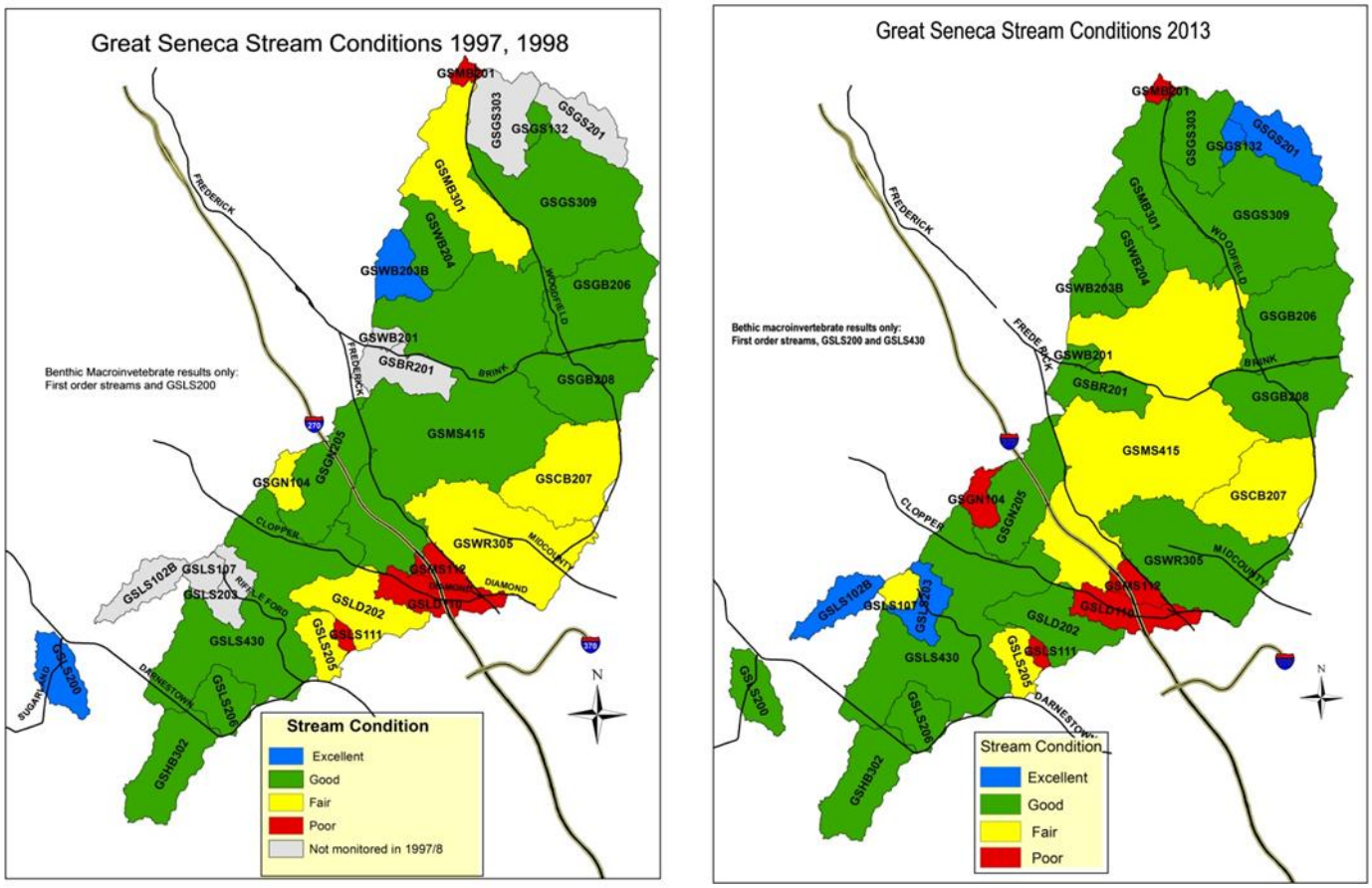


Figure III.F.1. Stream Conditions in the Great Seneca Creek Watershed 1997-1998, 2013

Upper Great Seneca

Figure III.F.2 shows stream conditions as a combined fish and aquatic insect IBI unless otherwise noted. Only results from the selected years are displayed. Stream conditions were predominantly good for the eight stations sampled in 1997-1998. Conditions remained generally in the good range for the next four monitoring rounds. Of the eleven stations monitored during both the 2006 and 2013 rounds, only one showed a change in stream condition (GSGS132) with a slight increase in IBI score moving it from good to excellent.

Because GSGS132 is a first order stream, only benthic macroinvertebrate sampling results are considered for IBI comparisons. The land use is low density residential and agricultural. Ratings have been good since monitoring began in 1997 and 2013 is the first occurrence of excellent. This increase appears to be related to the reemergence of the stonefly Amphinemura sp. well as improvement in the diversity of the community. Amphinemura sp., an intolerant shredder, dominated the 1997 sample (154 individuals). A low was recorded in 2001 (21 individuals). In 2013 numbers rebounded (108 individuals). Specialized feeding groups such as shredders and scrapers have become more prevalent while increases in sensitive ephemerella, plecoptera, and trichoptera (EPT) taxa (Mayflies, Stoneflies and Caddisflies) have also contributed to the diversity in general.

GSWB203B is a second order stream which changed from excellent in 2001 to good during the 2006 round of monitoring. Land use in the subwatershed is a mix of residential and agriculture. While fish survey results have remained excellent for all rounds of monitoring, minimal changes in the benthic diversity of were first seen in 2001. In 2006 the benthic community was the least diverse of any round of monitoring round, with only 10 taxa found. In addition there were more tolerant individuals present. The biotic index, the overall measure of tolerance, increased from 1.95 in 1997 to 5.28 in 2006. From the review of aerial photos from 2006 some construction activities were evident in the headwaters of GSWB203B. Construction activities seem to have stabilized in 2012 and coincide with a rebound in survey results.

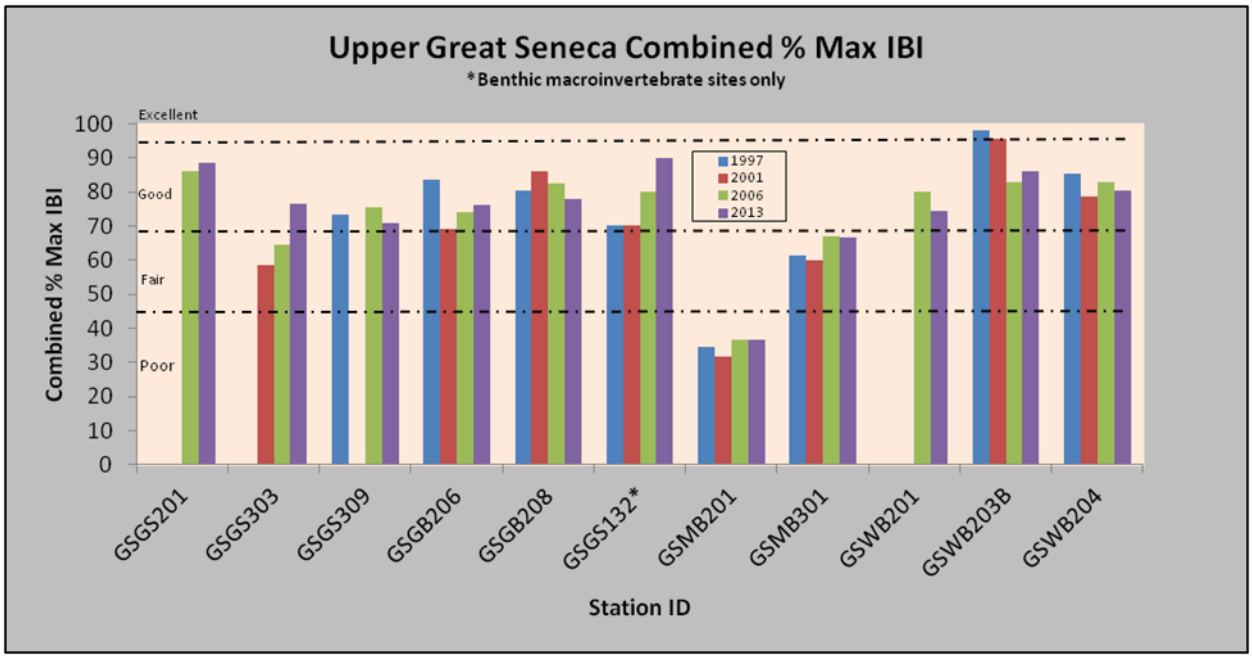


Figure III.F.2. Upper Great Seneca Combined % Max IBI (average of the BIBI and FIBI as a percentage of the maximum possible) for Stations Monitored in 1997, 2001, 2006 and 2013 for Benthic Macroinvertebrates and/or Fish

Middle Great Seneca

Figure III.F.3 shows stream conditions in the Middle Great Seneca for stations monitored in 1998, 2001, 2006 and 2013. The stream conditions were predominantly fair to good at the seven stations first sampled in 1998. Stream conditions in the Middle Great Seneca typically result in lower scores (more impaired) than in the Upper and Lower sections because the area receives runoff from the more urbanized areas of Germantown, Gaithersburg and the I270 corridor. Like the Upper Great Seneca, conditions have remained constant between monitoring rounds, ranging from 20 (poor) to 60 (fair). Any variation appears to be due to fish survey results which have varied from poor to excellent.

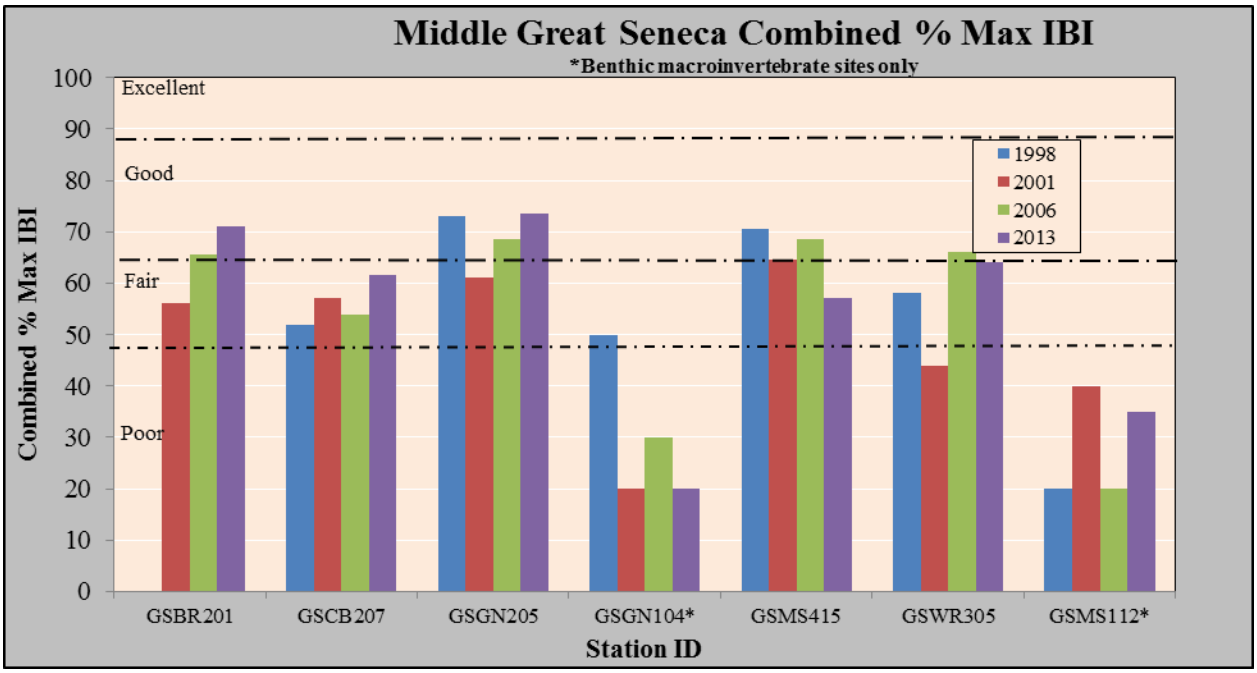


Figure III.F.3. Middle Great Seneca Combined % Max IBI

Conditions at GSBR201 and GSWR305 increased from fair to good between the 2001 and 2006 monitoring rounds. Both stations continue to be rated good in 2013.

Seven stations were monitored in both the 2006 and 2013 rounds. One station (GSMS415) changed conditions from good to fair due to decreases in the fish scores. This decrease is due to the change in the community composition. In 1998, 61 percent of the fish community was comprised of intermediately sensitive fish species. The proportion of tolerant fish species increased to 72 percent in 2013. Sensitive fish species remained at 3 to 4 percent for both years. Species categorized as omnivores and generalists do not depend on specialized stream conditions for feeding therefore tolerating degraded areas better. The proportion of omnivores increased from 29 percent in 1998 to 71 percent in 2013 while generalists decreased slightly from 11 percent to 8 percent. These metrics appear to be influenced by the Bluntnose minnow, a tolerant pioneering species of the omnivore feeding group. Five individuals were found in 1998. Numbers have increased to 284 in 2013.

Lower Great Seneca

Figure III.F.4 shows stream conditions in Lower Great Seneca for all four monitoring cycles from 1998 to 2013, although not all stations were monitored in all years. In 1998, the stream conditions ranged from poor to excellent at the eight stations sampled. As with the Upper and Middle Great Seneca, the stream conditions at each station have generally remained stable over the monitoring cycles. However, of the 10 stations monitored in the 2006 and 2013 rounds for benthics and/or fish, two edged into a higher category: GSLD202 (fair to good), and GSLS102B (good to excellent, using only the BIBI). GSLS200 has been dry during each fish monitoring event therefore only benthic macroinvertebrate data is available. GSLS200 was excellent in 1998. In 2001 the population became slightly more tolerant and with slightly less EPT taxa. This change resulted in a good rating which continues with the 2013 monitoring.

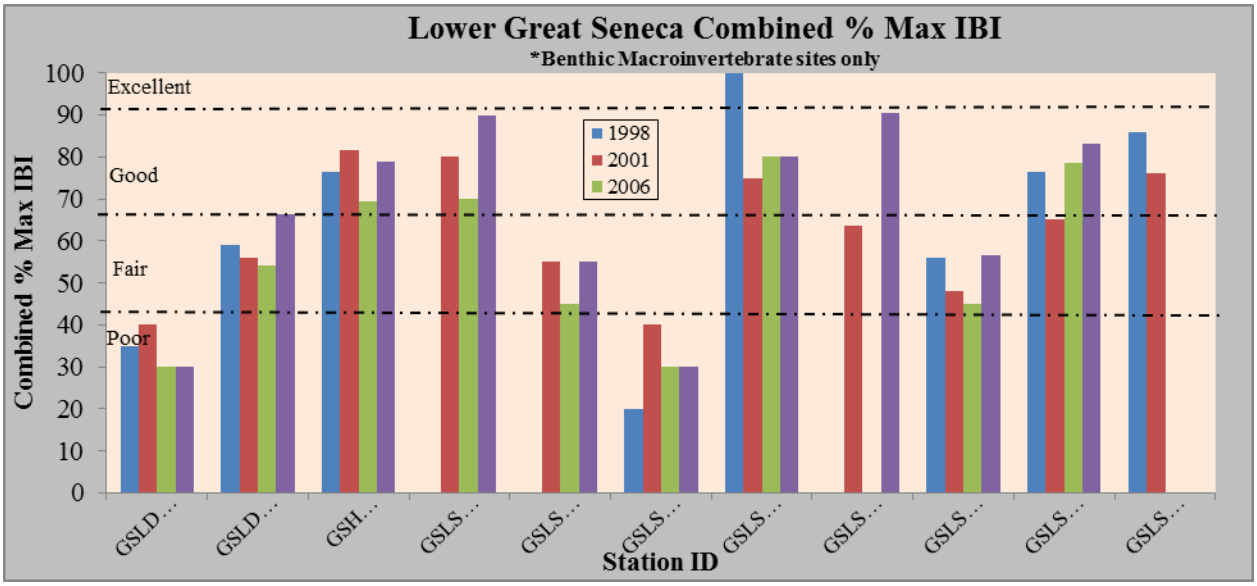


Figure III.F.4. Lower Great Seneca Combined % Max IBI

Based on aerial photos, the drainage area of GSLD202 appears to have undergone little change since monitoring began in 1998. Stream conditions have been consistently rated fair prior to 2013. The increase to a good rating is due to the improvement of the benthic IBI. Between 2006 and 2013, the BIBI score increased 83 percent impart to the presence of more scraper taxa. An increase in the proportion of scrapers may indicate limited easing of stressors to the stream. The slight increase in BIBI scores which occurred at GSLS102B was due to more EPT (pollutant sensitive) taxa and more taxa in general found in the 2013 sample. The upper reaches of the GSLS102B drainage area does appear to have gone through some limited construction activities since monitoring began here in 2001 perhaps reflected in the decrease in conditions during 2006 with an apparent rebound in 2013.

Conclusions

Great Seneca

The results for the Great Seneca watershed have remained fairly consistent for the 1998, 2001, 2006, and 2013 monitoring cycles. Fourteen (14) stations (48 percent) had the same category designation in 2013 as they had in 1997/1998. Eight stations (28 percent) were not monitored in the 1997/8 and/or 2013, three stations improved categories and four stations decreased categories.

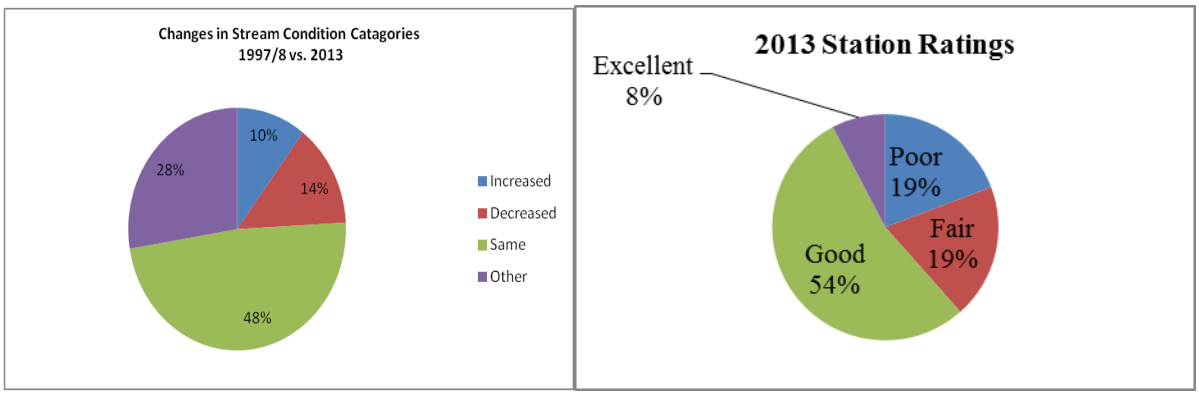


Figure III.F.5. Percentage of Combined % Maximum IBI for each Category in the Great Seneca Watershed

Figure III.F.5 displays the percentage of stations categorized as poor, fair, good and excellent. The Great Seneca watershed is predominantly rated good or excellent. The stations with lower ratings are located closer to more urban areas with older stormwater management. Unlike in the Rock Creek watershed, there are no restoration projects completed within this Permit cycle. However, average BIBI scores are used with other parameters to prioritize less healthy watersheds for improvements.

- New BMP Assessment Screening/Prioritization
- Right-of-Way BMP Assessment Screening/Prioritization
- Urban Reforestation Site Assessment Screening/Prioritization
- Stream Corridor Assessment Screening/Prioritization

Overview from 2010-2013

From 2010 through 2013, 117 baseline stations and 20 SPA stations have been monitored to provide assessment of water quality as required under Part III. F of the County's MS4 permit. For a summary of monitoring information and results for 2010-2013 see Table III.F.3. When compared to the earlier results, 36 sites had an increase in rating category, 21 had a decrease while 72 did not change categories in this monitoring cycle (2010-2013). Six stations had incomplete data sets for the current monitoring period, generally fishing results. Fishing surveys did not occur at LPAT201, LPRG202, PBPB302, LRLR425, GSLS203 and GSLS430 for reasons ranging from staffing limitations to the site being unfishable. Results have predominantly remained unchanged or increased slightly since the first monitoring cycle. Sligo Creek has been the focus of restoration since the mid 1980s however substantial change in IBI scores have yet to be realized. All Sligo Creek sites with long term monitoring have remained in the poor category. However restorations efforts in Lower Rock Creek, specifically Joseph's Branch, have seen slight improvements in the biology. Restoration efforts have affected fish habitat the most. Fish results have increased at a faster rate than the benthic macroinvertebrate communities. The urbanized location may limit noticeable improvements to the benthos.

Table III.F3. Summary of 2010-2013 Monitoring Results							
Watershed	Total # of Stations	Monitoring Year	Total # of Poor Ratings	Total # of Fair Ratings	Total # of Good Ratings	Total # of Excellent Ratings	No Rating*
Hawlings	8	2010	0	0	7	1	0
Horsepen	4	2010	0	1	3	0	0
Little Monocacy	3	2010	0	0	1	2	0
Patuxent	16	2010	0	1	6	6	3
Rock Run	2	2010	1	1	0	0	0
Little Paint Branch	6	2011	1	3	2	0	0
Northwest Branch	18	2011	2	11	5	0	0
Paint Branch	17	2011	0	8	8	0	1
Silgo Creek	6	2011	5	1	0	0	0
Rock Creek	28	2012	4	7	11	5	1
Great Seneca	29	2013	5	4	15	4	1
Total	137	-----	18	37	58	18	6

**At the following stations fish surveys did not occur: LPRG203, LPRG202, LPAT201, LRLR425 and PBPB302, GSLS430*

G. Watershed Restoration

The Permit requires the County to implement restoration practices identified through watershed assessments to control twenty percent of the County's impervious area not already controlled to the MEP. The Strategy provides the planning basis to meet the Permit's restoration goal. DEP developed the Strategy using 2009 data, including impervious area and BMP drainage areas. DEP notes that the Strategy was developed prior to MDE guidance for accounting for stormwater wasteload allocations and impervious acres treated. Figure III.G.1, below, shows the County impervious area subject to the Permit (2009).

The DEP is implementing watershed restoration projects to add stormwater management, improve water quality and minimize physical impacts to streams from uncontrolled urban runoff. Projects are completed primarily through DEP's Watershed Restoration program, funded through the County's CIP program and include construction of SWM pond retrofits, new stormwater ponds, ESD practices and stream restoration. DEP is continually assessing emerging stormwater control guidance and improving County data critical to watershed planning to ensure that the most beneficial, and cost effective projects are selected for implementation.

Several developments over the Permit term now allow more accurate impervious area control accounting. DEP updated the County impervious area GIS layer, and the urban BMP database, adding over 1,000 new BMPs. DEP made progress digitizing and refining the BMP's drainage

areas. MDE also published "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated" (MDE Guidance Document) in August 2014. DEP is currently using the new information to re-analyze the Permit baseline of uncontrolled impervious area, the impervious area controlled to the MEP in 2009, and the control achieved through implementation of restoration projects during the Permit term. DEP expects that re-analysis will show a reduced number of uncontrolled impervious acres in 2009. Since the Permit requires the County to restore 20% of its uncontrolled impervious, the County's impervious restoration goal is also expected to reduce.

Because DEP's annual MS4 Permit reports are based on fiscal year, this report only covers the County's progress towards meeting its Permit requirements through June 30, 2014 (FY14). DEP will submit a final Watershed Restoration report for this Permit cycle which will include County progress up to the end of the Permit term (February 16, 2015). The final Watershed Restoration report will present the results of DEP's comprehensive re-analysis of County controlled and uncontrolled impervious area, and area treated by restoration projects.

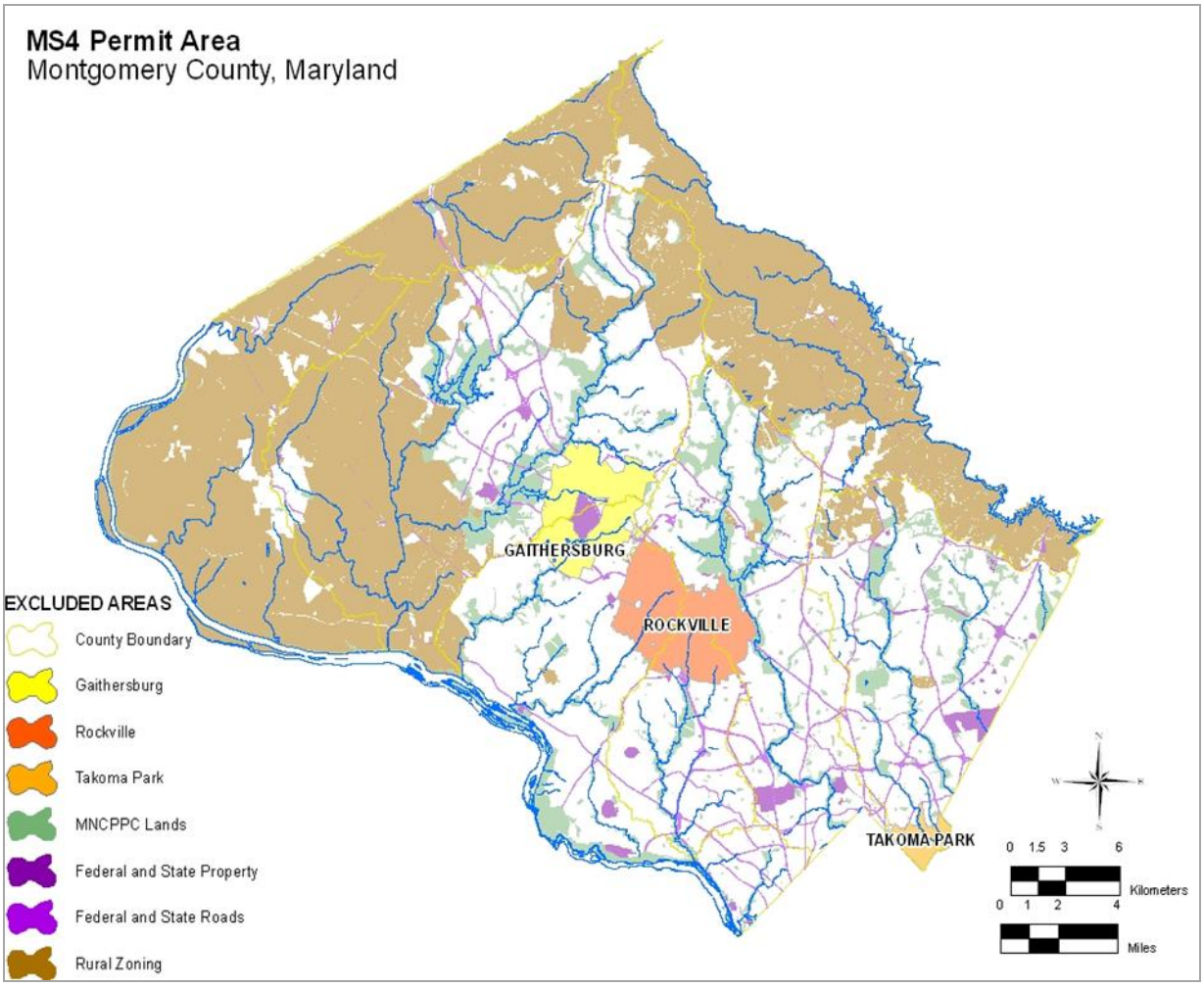


Figure III.G.1. County Area Subject to the MS4 Permit

Table III.G.1, below, summarizes County controlled and uncontrolled impervious area.

Table III.G.1. County Impervious Area Summary	
Description	Area in Acres
Total County Area	324,552
Total Impervious Area	35,965
Total County Area Subject to MS4 Permit (1)	138,649
Total County Impervious Area Subject to MS4 Permit	25,119
County MS4 Impervious Area with MEP Stormwater Management in 2009	5,239
Under or Uncontrolled Impervious Area Subject to MS4 Permit	19,880
20% Restoration Goal	3,976

1. Exclusions include: Certain zoning codes, parklands, forests, municipalities with own stormwater management programs, state and federal properties, and state and federal maintained roads

Progress Towards Meeting the Permit Impervious Restoration Goal

Since 2009, and through FY14, the County has:

- Implemented 651 projects restoring 646 impervious acres (Table III.G.3)
- Discovered from updated SWM BMP data that stormwater controls were added to an additional 143 impervious acres since 2009. Documentation for these BMPs will be provided in the final Watershed Restoration report.
- Partnered with other County and external agencies to complete projects which added stormwater controls to 241 impervious acres in the County's MS4 area. These projects include facility modification and modernizations performed by DOT, DGS, and MCPS, and WSSC's stream restoration activities during their asset modernization. They also include the Maryland State Highway Administration's (SHA's) Inter County Connector (ICC) mitigation partnership projects.
- Released Task Orders to DEP's water resources engineering consultants that facilitate the design of watershed restoration projects that will control an additional 2,386 impervious acres.

County progress towards meeting the 20 percent impervious restoration goal is shown in Table III.G.2, below. At the end of FY14, the County will achieve stormwater control for 3,766 impervious acres through restoration projects that are completed, under construction or in design. The remaining 210 acres will be controlled through partnership projects currently in design or under construction. More detail about these future partnership projects will be provided in the final Watershed Restoration report.

Table III.G.2. FY14 Restoration Implementation Progress Summary	
Description	Area in Acres, Using Updated Data FY 13
2010 MS4 Permit 20% Impervious Area Restoration Goal	3,976
Stormwater Controls Added Since 2009 (From County Backlogged SWM BMP Data)	143
Impervious Area Restored in FY11	24
Impervious Area Restored in FY12	116
Impervious Area Restored in FY13	265
Impervious Area Restored in FY14	241
Impervious Area Associated with Completed Partnership Projects	241
Total Impervious Area Control Implemented Since 2009	1,030
Impervious Area Associated with Watershed Restoration Projects Under Construction in FY14	130
Impervious Area Associated with Watershed Restoration Projects in Design as of FY14	2,386
Anticipated Impervious Area Associated with Watershed Restoration Projects in Design as of FY15	220
Remaining Impervious Area that will be Treated Through Future Partnership Projects	210
Total Acres Restored, Under Construction, In Design as of FY15	3,976

Completed Watershed Restoration Program (CIP) Projects

Table III.G.3, below summarizes the number and types of restoration projects that DEP completed through FY14.

Table III.G.3. FY14 Summary of Watershed Restoration Projects Completed		
Project Status	Number of Projects	Impervious Area Controlled (Acre)
Completed	108	384
RainScapes Rewards Completed Projects	484	10**
RainScapes Neighborhoods Completed Projects	59	4**
Arterial Street Sweeping	n/a	162
Storm Drain Cleaning	n/a	86
Total	651	646

*** Final impervious area treated through RainScapes Rewards and RainScapes Neighborhood projects do not include Conservation Landscape Practices and Tree Planting. Credit for those practices will be described and taken in the final Watershed Restoration report.*

Table III.G.4 provides detail on County projects completed through FY14.

Table III.G.4. Summary of Watershed Restoration Projects Completed Through FY14			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Anacostia River	111.65		181.13
Low Impact Development (LID) Project Total:	77.59		29.40
Arcola Avenue Green Streets - LID37 - SWM#3	0.13	0.05	
Arcola Avenue Green Streets - LID38 - SWM#4A	0.28	0.10	
Arcola Avenue Green Streets - LID39 - SWM#4B	0.28	0.10	
Arcola Avenue Green Streets - LID40 - SWM#5	0.68	0.22	
Arcola Avenue Green Streets - LID41 - SWM#6A	0.79	0.14	
Arcola Avenue Green Streets - LID42 - SWM#6B	0.79	0.14	
Arcola Avenue Green Streets - LID43 - SWM#7	0.29	0.11	
Arcola Avenue Green Streets - LID44 - SWM#8	0.23	0.10	
Arcola Avenue Green Streets - LID45 - SWM#9A	0.20	0.40	
Arcola Avenue Green Streets - LID46 - SWM#9B	0.40	0.40	
Arcola Avenue Green Streets - LID47 - SWM#9C	0.40	0.40	
Arcola Avenue Green Streets - LID48 - SWM#6C	0.79	0.14	
Dennis Avenue Green Streets - Phase 1 - LID53 - SWM#3	0.35	0.10	
Dennis Avenue Green Streets - Phase 1 - LID59 - SWM#8	0.10	0.09	
Dennis Avenue Green Streets - Phase 1 - LID61 - SWM#9A	0.10	0.07	
Dennis Avenue Green Streets - Phase 1 - LID65 - SWM#15	0.17	0.11	
Dennis Avenue Green Streets - Phase 1 - LID68 - SWM#17	2.69	0.72	
Dennis Avenue Green Streets - Phase 1 - LID69 - SWM#19	0.09	0.06	
Dennis Avenue Green Streets - Phase 1 - LID70 - SWM#20	0.08	0.06	
Dennis Avenue Green Streets - Phase 1 - LID75 - SWM#33	0.20	0.07	
Dennis Avenue Green Streets - Phase 1A-1B, 2A-2B	36.10	10.35	
Dennis Avenue Green Streets - Phase 2b - LID - SWM#11	5.10	0.00	
Dennis Avenue Green Streets - Phase 2B - LID54 -SWM#3A	0.10	0.09	
Dennis Avenue Green Streets - Phase 3A-B, 4	0.00	9.05	
Forest Estates Right of Way LID - LID13 - BMP#1	1.04	0.22	
Forest Estates Right of Way LID - LID14 - BMP#3	0.55	0.15	
Forest Estates Right of Way LID - LID15 - BMP#6	0.31	0.12	
Forest Estates Right of Way LID - LID16 - BMP#7	0.09	0.06	
Forest Estates Right of Way LID - LID17 - BMP#8	1.09	0.27	
Forest Estates Right of Way LID - LID18 - BMP#9	0.75	0.23	
Forest Estates Right of Way LID - LID19 - BMP#10	0.38	0.12	

Table III.G.4. Summary of Watershed Restoration Projects Completed Through FY14			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Forest Estates Right of Way LID - LID20 - BMP#12	0.13	0.13	
Forest Estates Right of Way LID - LID21 - BMP#13	0.80	0.32	
Forest Estates Right of Way LID - LID22 - BMP#18	1.91	0.56	
Forest Estates Right of Way LID - LID23 - BMP#21	0.34	0.15	
Forest Estates Right of Way LID - LID24 - BMP#22	0.56	0.28	
Forest Estates Right of Way LID - LID25 - BMP#23	0.46	0.21	
Forest Estates Right of Way LID - LID26 - BMP#25	2.32	0.48	
Forest Estates Right of Way LID - LID27 - BMP#26	0.78	0.26	
Forest Estates Right of Way LID - LID28 - BMP#27	0.83	0.42	
Forest Estates Right of Way LID - LID29 - BMP#41	0.44	0.19	
Forest Estates Right of Way LID - LID30 - BMP#28	0.15	0.07	
Forest Estates Right of Way LID - LID31 - BMP#30	0.21	0.11	
Forest Estates Right of Way LID - LID32 - BMP#35	0.39	0.20	
Forest Estates Right of Way LID - LID33 - BMP#36	0.23	0.11	
Forest Estates Right of Way LID - LID34 - BMP#37	0.30	0.14	
Forest Estates Right of Way LID - LID35 - BMP#43	0.28	0.15	
Forest Estates Right of Way LID - LID36 - BMP#44	0.22	0.11	
White Oak LID (Lockwood Drive and Stewart Lane)	12.69	1.27	
Pavement Removal Total:	0.09		0.06
Arcola Avenue Green Streets - LID - SWM#6B Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID - SWM#6C Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID - SWM#9C Pavement Removal	0.02	0.01	
Arcola Avenue Green Streets - LID38 - SWM#4A Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID39 - SWM#4B Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID40 - SWM#5 Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID41 - SWM#6A Pavement Removal	0.00	0.00	
Arcola Avenue Green Streets - LID43 - SWM#7 Pavement Removal	0.01	0.01	
Arcola Avenue Green Streets - LID44 - SWM#8 Pavement Removal	0.01	0.01	

Table III.G.4. Summary of Watershed Restoration Projects Completed Through FY14			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Stream Restoration Total:	0.00		136.12
Batchellors Run East Stream Restoration	0.00	19.01	
Batchellors Run II Stream Restoration	0.00	25.87	
Bryants Nursery Run Stream Restoration	0.00	17.42	
Sherwood Forest I Stream Restoration	0.00	29.04	
Upper Northwest Branch Stream Restoration	0.00	21.65	
Woodlawn Stream Restoration	0.00	23.13	
Stream Restoration Complete by DOT Total:	0.00		4.65
Road Culvert Stabilization - 821 McCeney Avenue (McCeney at Harper)	0.00	0.40	
Road Culvert Stabilization - Burnt Mills Avenue at Hoyle Avenue	0.00	0.75	
Stream Bank Stabilization through Gabion Walls - Woodman Ave Median	0.00	0.00	
Stream Restoration - Bucknell Drive Median Stream Channel	0.00	3.50	
Stream Restoration through Gabion Walls - 9512 Columbia Blvd	0.00	0.00	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		0.00
Outfall Stabilization - 13717 Mills Avenue	0.00	0.00	
Outfall Stabilization - 1517 Menlee Drive	0.00	0.00	
Outfall Stabilization - 611 Lamberton Drive	0.00	0.00	
Outfall Stabilization - Wayne Avenue at Sligo Creek Parkway	0.00	0.00	
Stormwater Pond Retrofit Total:	75.17		10.91
Fairland Ridge Dry PD	53.45	7.36	
Peachwood I	21.72	3.54	
Cabin John Creek	**0.00**		**49.71**
Stream Restoration Total:	0.00		48.46
Lower Booze Creek	0.00	48.46	
Stream Restoration Complete by DOT Total:	0.00		1.25
Stream Restoration - 9014 Marseille Drive	0.00	1.25	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		0.00
Outfall Stabilization - 7208 Helmsdale Road	0.00	0.00	
Potomac Direct	**116.40**		**11.48**
Low Impact Development (LID) Project Total:	1.25		0.67
Cold Spring Elementary School	1.25	0.67	
Stream Restoration Total:	0.00		10.56
Little Falls - Somerset	0.00	5.28	

Table III.G.4. Summary of Watershed Restoration Projects Completed Through FY14			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Little Falls III	0.00	5.28	
Stream Restoration Complete by DOT Total:	0.00		0.25
Road Culvert Stabilization - Circle Drive at Spring Drive	0.00	0.25	
Rock Creek	**218.18**		**138.26**
Low Impact Development (LID) Project Total:	2.86		1.26
Aspen Hill Library BMP-103	2.04	0.47	
Aspen Hill Library BMP-104	0.32	0.12	
Kensington Park Library BMP-201	0.41	0.22	
Kensington Park Library BMP-203	0.09	0.06	
Kensington Park Library BMP-204	0.00	0.07	
Kensington Park Library BMP-205	0.00	0.32	
Pavement Removal Total:	0.02		0.02
Aspen Hill Library BMP-104 - Pavement Removal	0.01	0.01	
Kensington Park Library - Pavement Removal	0.01	0.01	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		11.06
Joseph's Branch Phase 3B Spruell Drive	0.00	10.06	
Stream Outfall Restoration - 4305 Havard Street	0.00	1.00	
Stormwater Pond Retrofit Total:	9.74		15.68
Silver Spring Ride-on/Brookville Bus Depot	9.74	6.60	
Georgian Colonies (Condominium Associates #1-4)	0.00	4.08	
Georgian Woods Colonies (Georgian Colonies Condo Assoc. #5)	0.00	5.00	
New Stormwater Pond	**215.30**		**110.24**
NIH Pond	215.30	110.24	
Rocky Gorge Dam	**0.00**		**0.00**
Stormwater Outfall Stabilization Complete by DOT Total:	0.00	0.00	
Outfall Stabilization - 1012 Parrs Ridge	0.00	0.00	
Seneca Creek	**3.11**		**3.64**
Low Impact Development (LID) Project Total:	3.11		1.79
Ridgeview Middle School LID Retrofits - LID77 - BMP #101	1.08	0.77	
Ridgeview Middle School LID Retrofits - LID77 - BMP #105	0.61	0.19	
Ridgeview Middle School LID Retrofits - LID78 - BMP #102	0.49	0.33	
Ridgeview Middle School LID Retrofits - LID78 - BMP #104	0.60	0.32	
Ridgeview Middle School LID Retrofits - LID79 - BMP #103	0.33	0.18	
Stream Restoration Complete by DOT Total:	0.00		1.85
Road Culvert Replacement - Davis Mill Road at Wildcat Road	0.00	1.00	

Table III.G.4. Summary of Watershed Restoration Projects Completed Through FY14			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Culvert			
Road Culvert Replacement - Prathertown Road Culverts	0.00	0.35	
Stream Restoration - 9412 Emory Grove Road	0.00	0.50	
Stormwater Outfall Stabilization Complete by DOT Total:	0.00		0.00
Outfall Stabilization - Wightman Road at Aspenwood Culverts	0.00	0.00	
Grand Total	449.34		384.22

Note: Impervious Acre controlled for Stream Restoration based on MDE Guidance, June 2011.

Watershed Restoration Projects (CIP) Under Construction

Projects under construction through DEP's Watershed Restoration (CIP) program in FY14 will treat another 129.80 acres of uncontrolled impervious area, and are presented in Table III.G.5, below.

Table III.G.5. Summary of Watershed Restoration Projects Under Construction in FY14			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Anacostia River			**93.64**
Low Impact Development (LID) Project Under Construction Total:			18.50
Sligo Park Hills - DOT Partnership	TBD	18.50	
Stream Restoration Under Construction Total:			44.70
Hollywood Branch 3		44.70	
Stormwater Pond Retrofit Under Construction Total:			30.44
Montgomery Auto Sales Park Regional	180.99	21.50	
Naples Manor Dry Pond	57.85	8.94	
Potomac Direct			**13.10**
Stormwater Pond Retrofit Under Construction Total:			13.10
Fallsberry SWM Pond	55.80	13.10	
Rock Creek			**23.06**
Low Impact Development (LID) Project Under Construction:			3.42
Donnybrook Drive	2.30	3.42	
Stream Restoration Under Construction:			19.64
Lower Donnybrook		19.64	
Grand Total			129.80

**The proposed impervious drainage area is an estimate and does not reflect the final project computations*

Projects in Design by DEP's Watershed Restoration (CIP) Program in FY14

A summary of projects under design in FY14 are presented in Table III.G.6. DEP has 27 ESD projects, 88 stormwater pond retrofits, and 14 stream restoration projects currently in design, projected to treat another estimated 2,385.62 acres of impervious area. Many of the projects under design are anticipated to go into construction within FY15-FY17.

Table III.G.6. FY14 Summary of Watershed Restoration Projects in Design

Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Anacostia River	**570.54**		**278.88**
Low Impact Development (LID) Project Total:	202.42		68.05
Amherst Green Streets	1.31	0.66	
Breewood Green Streets	7.13	2.79	
Cannon Road Green Streets (Carole Acres /Colesville Gardens/ Buckly Downs)	23.5	5.90	
Franklin Knolls and Clifton Park Green Streets	74.35	27.61	
McDonald Knolls-Ballantrae-Sligo Estates Green Streets	26.94	1.88	
Springbrook / Homestead Estate Green Streets	TBD	1.78	
Tenbrook Green Streets	4.65	2.38	
University Towers Stormwater Practice Upgrades	1.60	4.42	
Argyle Middle School Stormwater Practice Upgrades	19.90	3.37	
Oak View Elementary School Stormwater Practice Upgrades	0.99	0.54	
Sherwood Elementary School Stormwater Practice Upgrades	10.85	4.42	
Sligo Middle School Stormwater Practice Upgrades	20.84	5.95	
White Oak Middle School Stormwater Practice Upgrades	5.86	3.59	
Colesville Park & Ride Stormwater Practice Upgrades	1.51	1.36	
Greencastle Park & Ride Stormwater Practice Upgrades	2.99	1.39	
Stream Restoration Total:	0.00		116.20
Bel Pre Creek Stream Restoration		30.00	
Breewood Tributary Stream Restoration		12.80	
Snowdens Mill and Falling Creek Stream Restoration		73.40	
Stormwater Pond Retrofit Total:	368.12		94.63
Columbia Towers SWM Retrofit	28.00	5.04	
Dumont Oaks I SWM	37.94	11.34	
Gaywoods Pond	123.60	4.25	
Greencastle Lakes (CA) SQ# 1039	100.18	43.19	
Kemp Mill Pond (Kemp Mill Forest - Ravenswood HOA)	31.83	7.96	

Table III.G.6. FY14 Summary of Watershed Restoration Projects in Design			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Kemp Mill Urban Park Stormwater Pond Retrofit	0.00	2.00	
Longmeade Crossing Pond	14.34	9.70	
Bel Pre Manor Stormwater Pond Retrofit (NW-U-01-S-130)	18.50	5.46	
Stonehedge Condo SWM Retrofit	13.73	5.69	
Cabin John Creek	**137.02**		**54.76**
Low Impact Development (LID) Project Total:	10.39		2.65
Potomac Community Recreation Center Stormwater Practice Upgrades	10.39	2.65	
Stream Restoration Total:	0.00		18.00
Old Farm Creek Stream Restoration	0.00	18.00	
Stormwater Pond Retrofit Total:	126.63		34.11
Fox Hills of Potomac	15.20	4.35	
Fox Hills of Potomac (Normandy Falls HOA) SQ#314	5.39	2.25	
Pine Knolls	81.04	18.10	
Washington Science Center	25.00	9.41	
Potomac Direct	**1,055.91**		**376.68**
Low Impact Development (LID) Project Total:	1.85		1.97
Little Falls Library Stormwater Practice Upgrades	1.85	1.970	
Stream Restoration Total:	0.00		125.80
Glenstone Stream Restoration	0.00	80.00	
Fallsreach Stormwater Pond Upgrades and Stream Restoration	0.00	15.85	
Flints Grove Stormwater Pond Upgrades and Rich Branch Stream Restoration	0.00	15.00	
Kilgour Branch Stormwater Pond Upgrades and Stream Restoration	0.00	14.95	
Stormwater Pond Retrofit Total:	1,054.06		248.91
Bedfordshire SWM	144.20	47.60	
Clagett Farm - Glynshire Way	50.80	15.60	
Clagett Farm - Ridge Mist Terrace	27.50	7.20	
Fallsreach SWM Pond	135.70	29.30	
Flints Grove HOA Dufief	82.18	11.40	
Mills Farm	56.11	14.50	
Potomac Chase	131.49	34.60	
Potomac Chase (Fox Hills North CA) - SQ#389	52.59	19.80	
Potomac Ridge (HOA) SQ#148	60.40	18.51	

Table III.G.6. FY14 Summary of Watershed Restoration Projects in Design			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Potomac Ridge (HOA) SQ#175	58.80	9.60	
Potomac Ridge (HOA) SQ#237	7.94	2.50	
Potomac Ridge (HOA) SQ#251	47.26	9.40	
Woodrock (Rockwood SP)	199.08	28.90	
Rock Creek	**1,164.15**		**480.75**
Low Impact Development (LID) Project Total:	160.87		65.90
Glenmont Forest Green Streets	48.70	16.64	
Manor Woods Green Streets	42.20	20.40	
Spring Street and Second Street Green Streets	0.00	0.00	
Wheaton Woods I Green Streets	52.94	18.17	
Newport Mills Middle School Stormwater Practice Upgrades	2.66	5.37	
Olney Elementary School Stormwater Practice Upgrades	9.78	3.39	
Strathmore Elementary School Stormwater Practice Upgrades	3.41	1.39	
Bushy Drive Recreation Center Stormwater Practice Upgrades	1.18	0.54	
Stream Restoration Total:	0.00		135.00
Grosvenor\Luxmanor Stream Restoration	0.00	80.00	
Stonybrook Tributary Stream Restoration	0.00	55.00	
Stormwater Pond Retrofit Total:	1,003.28		279.85
Metro Park N 1, SWM retro	27.50	15.66	
Metro Park N 2, SWM retro	20.80	14.20	
Mill Creek South 1 SWM	588.00	122.00	
Montgomery Manor (Emory Grove No. 2, SWM retrofit)	9.75	5.00	
Old Georgetown Village SWM	65.10	31.72	
Tuckerman Lane SWM retro	292.13	91.27	
Rocky Gorge Dam	**12.20**		**3.10**
Low Impact Development (LID) Project Total:	12.20		3.10
Longwood Community Center Stormwater Practice Upgrades	12.20	3.10	
Seneca Creek	**3,344.62**		**1,191.45**
Low Impact Development (LID) Project Total:	10.20		6.28
Germantown MARC Rail Park& Ride Stormwater Practice Upgrades	10.20	6.28	
Stream Restoration Total:	0.00		107.08
Clearspring Manor Stormwater Pond Upgrades & Stream	0.00	7.48	

Table III.G.6. FY14 Summary of Watershed Restoration Projects in Design			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Restoration			
Germantown Park Stormwater Pond Upgrades and Stream Restoration (Phase II)	0.00	8.00	
Gunners Branch Stream Restoration	0.00	78.60	
Plum Gar Stream Restoration	0.00	13.00	
Stormwater Pond Retrofit Total:	3,334.42		1,078.09
Chadswood	195.27	16.70	
Chesney	20.00	4.14	
Churchill Town Sector (Waters Landing Assoc.)	67.50	11.50	
Cinnamon Woods (Homes Association) SQ#125	1.18	0.74	
Cinnamon Woods (Homes Association) - 615	20.16	5.00	
Cinnamon Woods (Homes Association) - North Pond	1.82	2.71	
Cinnamon Woods (Homes Association) - South Pond	1.79	2.71	
Cinnamon Woods (Homes Association) SQ#612	28.21	10.43	
Cinnamon Woods (Homes Association) SQ#616	4.55	2.18	
Cinnamon Woods (Homes Association) SQ#617	9.23	2.73	
Clearspring Manor	66.22	7.25	
Collingwood HOA	18.80	7.64	
Emory Grove (Greenfield Station HOA)	21.00	8.22	
Germantown Park (Gunners Branch Local Park) SQ#871	4.95	1.92	
Germantown View (Seneca Forest HOA)	25.37	11.59	
Goshen East	66.61	34.43	
Green Hills (Magruder Branch SVU) SQ#720	17.00	3.91	
Greenhills (Magurder Branch SVU) SQ#106	62.00	12.79	
Gunners Lake Village	1037.20	226.11	
Hunters Woods III SWM (Cabin Branch SVP)	25.60	6.20	
Manchester Farm Comm. Assoc. Regional	276.57	160.40	
Meadowvale	37.80	11.92	
Montgomery County Airpark Regional	84.80	60.72	
Montgomery Village (PEPCO)	28.70	10.92	
Montgomery Village 1-B (South Village Homes Corporation)	8.70	5.50	
Montgomery Village/Horizon Run	49.20	23.97	
North Lake Apartments	15.18	5.97	
Partridge Place	46.58	2.95	
Plumgar II Regional (Great Seneca SVU)	7.20	27.73	

Table III.G.6. FY14 Summary of Watershed Restoration Projects in Design			
Watershed and Project	Total Drainage Area (Acre)	Impervious Area Controlled (Acre)	
Quail Ridge Townhouse Assoc.	13.14	6.40	
Quail Valley #1 (Montgomery West HOA)	7.50	4.66	
Quail Valley #2 (Cabin Branch SVP)	23.80	11.80	
Quail Valley (HOA)	71.21	13.12	
Quail Valley Pond 2	20.88	8.08	
Quince Orchard Manor (Quince Orchard Valley Neighborhood Park)	225.10	77.70	
Seneca Park (Great Seneca SVU)	18.00	6.53	
Seneca Whetstone (Great Seneca SVU) SQ#267	20.30	7.33	
Seneca Whetstone (Great Seneca SVU) SQ#268	10.30	3.97	
Seneca Whetstone (HOA)	9.30	1.93	
Stewartown Homes	50.51	7.68	
Stoneridge (Community Council Corp.) SQ#1185	18.76	10.80	
Strawberry Knoll	0.00	9.60	
The Plantations	178.67	79.80	
The Plantations (Plantations Two CA)	88.25	17.50	
Thomas Choice Condominium, Maryland Place Homes Corp.	28.45	10.14	
Upper County Outdoor Pool	4.40	3.63	
Valley Park (Magruder Branch SVU)	190.70	73.65	
Watkins Meadow (Great Seneca SVU)	54.80	14.19	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#1025	2.48	1.30	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#1027	10.75	5.60	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#627	5.22	1.60	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#627.02	4.17	1.30	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#627.03	4.36	1.30	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#627.04	2.72	0.30	
Williamsburg Square Williamsburg Square Comm Council Corp SQ#628	3.45	1.50	
Willow Ridge (Orchard Neighborhood Park)	31.14	7.70	
Grand Total	4,546.46		2,385.62

Note: Impervious Acre controlled for Stream Restoration based on MDE Guidance, June 2011.

Projects to be in Design by DEP's Watershed Restoration (CIP) Program in FY15

A summary of projects to be designed in FY15 are presented in Table III.G.7. DEP anticipates 2 ESD projects, 24 stormwater pond retrofits, and 2 stream restoration projects expected to be in design in FY15. Projects currently scoped for bidding includes 220 currently uncontrolled impervious acres captured once these projects are completed.

Table III.G.7. Summary of Watershed Restoration Projects under Task Order for Design FY15

Watershed and Project	Number of Projects	Drainage Area (Acre)	Proposed Impervious
Anacostia River	4		36
Stormwater Pond Retrofit	3	93	
Stream Restoration	1	0	
Potomac Direct	8		50
Stormwater Pond Retrofit	8	217	
Rock Creek	6		64
Stormwater Pond Retrofit	5	179	
Stream Restoration	1	0	
Seneca Creek	8		70
Stormwater Pond Retrofit	8	334	
Other Budgeted FY15 Projects*	2		TBD*
Low Impact Development	2	TBD*	
Total for All Watersheds	26		220

**Individual projects to be identified in FY15*

Table III.G.8 presents a summary of projects identified through watershed assessments as potential future projects. This summary does not include projects identified in the new Patuxent, Lower Monocacy, Potomac Direct, and Seneca Creek watershed studies, as they were not complete by the end of FY14.

Table III.G.8. Summary of Watershed Restoration Potential Opportunity Projects Identified for Future Consideration			
Watershed and Potential Opportunity Project Type	Number of Projects	Proposed Impervious Area Treated (Acre)†	
Anacostia River	**871**		**4,822.53**
LID Project	398	2,183.00	
Existing Stormwater Facility Verification to the MEP**	1	1.04	
Stream Restoration	235	1,561.71	
Stormwater Outfall Stabilization Potential Opportunity:	1	4.50	
New Stormwater Pond	7	66.06	
Stormwater Pond Retrofit	195	1,003.49	
New Wetland	34	2.73	
Cabin John Creek	**28**		**807.00**
LID Project	8	64.01	
Existing Stormwater Facility Verification to the MEP**	2	29.00	
Stream Restoration	14	646.23	
New Stormwater Pond	2	7.60	
Stormwater Pond Retrofit	2	60.16	
Lower Monocacy River	**1**		**0.77**
LID Project	1	0.77	
Potomac Direct	**79**		**2,449.56**
LID Project	8	13.05	
Existing Stormwater Facility Verification to the MEP**	9	137.43	
Stream Restoration	45	907.93	
Stormwater Pond Retrofit	17	1,391.15	
Rock Creek	**66**		**1,561.06**
LID Project	23	361.83	
Existing Stormwater Facility Verification to the MEP**	11	54.93	
Stream Restoration	17	565.40	
New Stormwater Pond	3	497.00	
Stormwater Pond Retrofit	12	81.90	
Rocky Gorge Dam	27		937.46
LID Project	7	47.92	
Existing Stormwater Facility Verification to the MEP**	3	47.87	
Stream Restoration	14	754.94	
Stormwater Pond Retrofit	3	86.73	
Seneca Creek	**80**		**1,691.34**
LID Project	10	72.76	
Existing Stormwater Facility Verification to the MEP**	7	49.29	

Table III.G.8. Summary of Watershed Restoration Potential Opportunity Projects Identified for Future Consideration			
Watershed and Potential Opportunity Project Type	Number of Projects	Proposed Impervious Area Treated (Acre)†	
Stream Restoration	33	970.70	
Stormwater Pond Retrofit	30	598.59	
Upper Patuxent River	**1**		**1.98**
LID Project	1	1.98	
Total for all Watersheds	1,153		12,271.69

LID=low impact development

**The Potential Opportunity Projects have not been determined to be fully feasible and some may be dropped during the planning design stage*

***Existing stormwater facilities, previously not credited to the MS4 permit which are being verified they meet the New Stormwater Regulation Requirements. A Site Specific Report will be generated once the facility is fully evaluated to determine credit towards MS4 Permit requirements.*

†The proposed impervious drainage area is an estimate and does not reflect final project computations.

Highlights of FY14 Watershed Restoration Projects

Table III.G.9, below shows highlighted projects the DEP has constructed as part of meeting its goals of the MS4 Permit.

Table III.G.9. Highlighted Watershed Restoration Projects for FY14			
	Project Name	Impervious Acres Captured	Photo
Stormwater Pond	Georgian Colonies	5 Acres	
Stream	Donnybrook Stream Restoration	19.64 Acres	
Public Property Low Impact Development (LID)	Kensington Library	0.67 Acres	
Roadway LID	Franklin Knolls Green Streets – Phases 1 and 2	~28 Acres	

Hollywood Branch Steam Restoration Project

The Hollywood Branch Stream Restoration was identified during the prior Permit cycle as a project required to meet watershed restoration goals. The Project will be completed during the current Permit term, and will mitigate stream degradation caused by past suburban development without adequate stormwater controls. Hollywood Branch is located in an eastern Montgomery

County suburb and is a 2.5 mile long, second order tributary to Paint Branch (a tributary of the Anacostia River). Stream restoration goals include: stabilizing erosive areas, improving floodplain access, enhancing riparian conditions, enhancing stream conditions and improving overall aquatic resources. In May of 2014, DEP began construction on the upper project reach and continued 3,200 linear feet downstream until the stream closure period. While constructing the project, DEP discovered a leaking sewer house connection and worked with WSSC to repair the broken pipe and prevent raw sewage from entering into the stream channel. During the stream closure over 256 trees, 429 shrubs and 3,684 live stakes were planted within the completed reach. Figure III.G.2 shows a Hollywood Branch section before and after restoration.

Figure III.G.2. Pre-restoration (left) and Post-restoration Conditions (right) at Hollywood Branch (Photos taken: 8/30/11 and 12/18/14 respectively)

Public Property ESD

During FY14, the DEP continued to design and implement ESD projects on public property, including school grounds, libraries and community centers and along county roadways within the public ROW. Figure III.G.3 shows project locations and status of various school and public facilities through FY14.

MCPS Properties

In 2010, when MCPS was added to the County's Permit as a co-permittee, DEP and MCPS executed a memorandum of understanding (MOU) defining relative roles and responsibilities concerning Permit requirements. The MOU included provisions for identification and construction of SWM BMPs, including ESD practices, on MCPS properties through DEP programs. DEP is working with MCPS to construct stormwater control above that required for new school construction and modernization, and to construct SWM BMP retrofits on other MCPS properties. The MOU also provided for MCPS staff education on SWM BMPs function, and correct non-structural maintenance.

In FY13, MCPS completed 160 stormwater projects that incorporated ESD to the MEP, as required by new storm water management regulations, through the use of vegetative roofs, bioretention and bio filtering facilities, micro bioretention structures, porous pavements and other innovative devices, at a cost of $10,124,553.

In FY13, DEP continued the assessment of 61 schools located within the Little Seneca Creek, Rock Creek, Little Falls, Cabin John, Muddy Branch, Watts Branch, and Little Bennett subwatersheds for ESD retrofit opportunities. ESD retrofit opportunities at these 61 schools will be added to an existing inventory of ESD retrofit opportunities at 70 schools (completed in October 2011). The ESD retrofit inventory will then include opportunities from 131 schools or 60 percent of all schools in the county. DEP meets every 2 months with Montgomery County Public Schools to coordinate implementation of ESD retrofit projects on school sites. The ESD retrofit inventory provides a vital planning tool for the coordination meetings.

During FY13, DEP constructed eight (8) ESD retrofit projects, providing water quality treatment for a total 2.75 impervious acres, at Cold Spring Elementary School and Ridgeview Middle School. Engineering and design for ESD retrofit projects are underway at five additional schools (Olney Elementary School, Rosa Parks Middle School, Oakview Elementary School, Strathmore Elementary School and White Oak Middle School), with construction expected in FY15. Due to safety concerns, all construction activities at MCPS must occur during the summer months when schools are closed, which may result in delays.

In FY14, DEP continued work on engineered design plans for ESD retrofit projects at five schools (Olney Elementary School, Rosa Parks Middle School, Oakview Elementary School, Strathmore Elementary School and White Oak Middle School) and expect projects at these schools to be ready for construction in summer of 2016. Work began on engineered design plans for ESD retrofit projects at four additional schools (Newport Middle School, Sligo Middle School, Argyle Middle School and Sherwood Elementary School).

Public Facilities

The DEP completed construction of 6 ESD projects that treat 1.26 impervious acres at Aspen Hill and Kensington Libraries. ESD project engineering and design began in March 2013 at two county owned facilities, Little Falls Library and Bushey Drive Recreation Center. Within FY14, work continued on engineered design plans for ESD retrofit projects at Little Falls Library and Bushey Drive Recreation Center, construction is expected FY16.

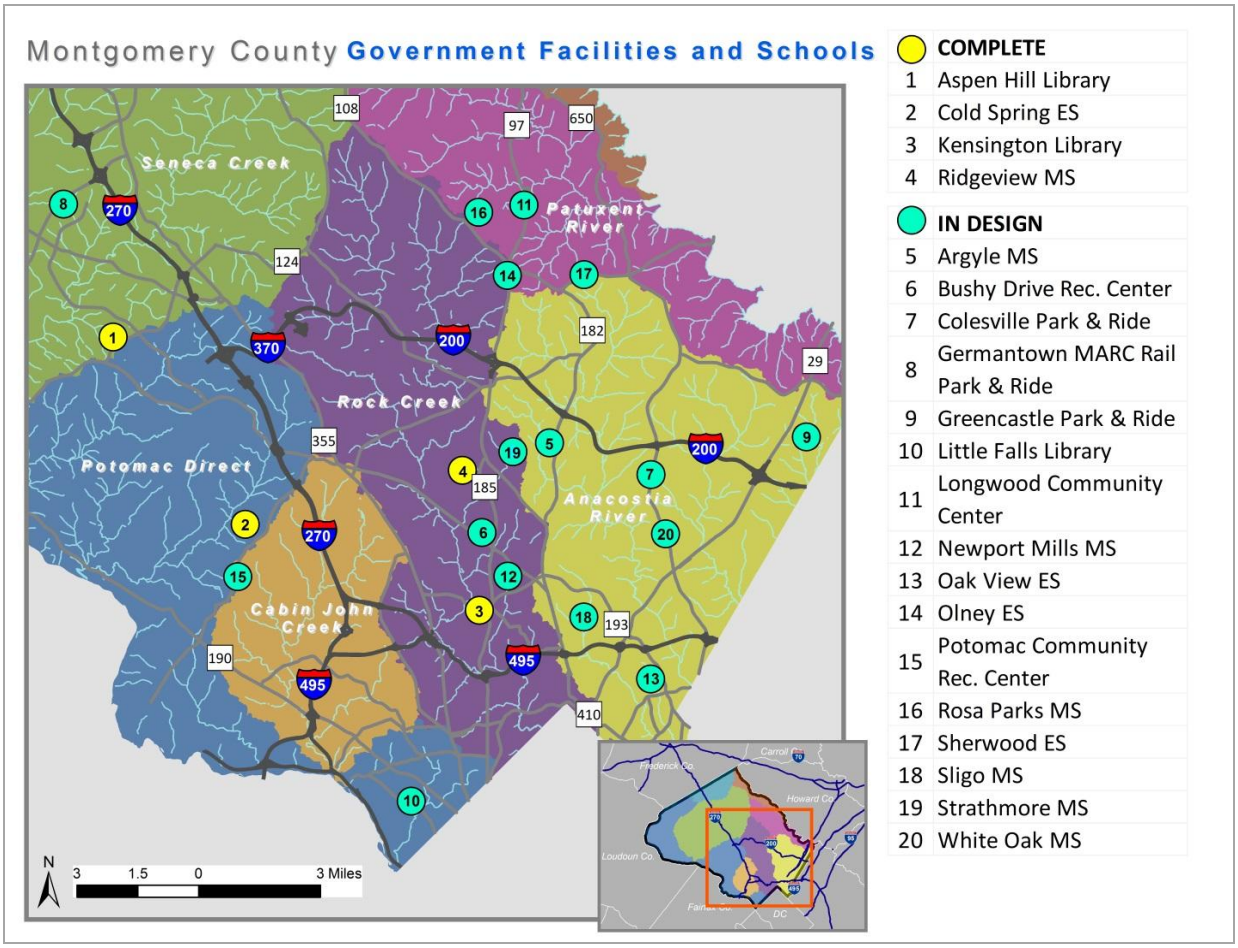


Figure III.G.3. Project Locations and Status of Various School and Public Facilities through FY14

Public Right of Way-County "Green Streets" Program

"Green Streets" are roadways where ESD practices are constructed within the street right-of-ways to capture stormwater runoff. DEP collaborates with DOT to implement "Green Street" projects in areas where DOT is schedule to do roadway maintenance or renovation. "Green Streets" are part of a County initiative to capture stormwater runoff in neighborhoods with minimal stormwater controls and little open space to install large stormwater practices. They also create aesthetically attractive streetscapes, provide natural habitat, and help visually to connect neighborhoods, schools, parks, and business districts.

The DEP continued to work on implementing ESD projects within the ROW along Amherst Ave (2 projects), Arcola Ave (12 projects), Dennis Ave (9 projects), Breewood neighborhood, Forest Estates neighborhood (24 projects), Sligo Park Hills neighborhood, White Oak – Stewart Ln and Lockwood Dr. (12 projects). Figure III.G.4, below, shows the locations of Green Streets Projects.

During FY14 construction began on Green Streets neighborhood projects in the Breewood, Franklin Knolls, Sligo Park Hills (Figure III.G.6), Donnybrook (Figure III.G.5), and in the Dennis Ave. Work also began on engineered design plans for Green Streets in Springbrook-Homestead neighborhood, Wheaton Woods neighborhood and the Glenmont Forest neighborhood.

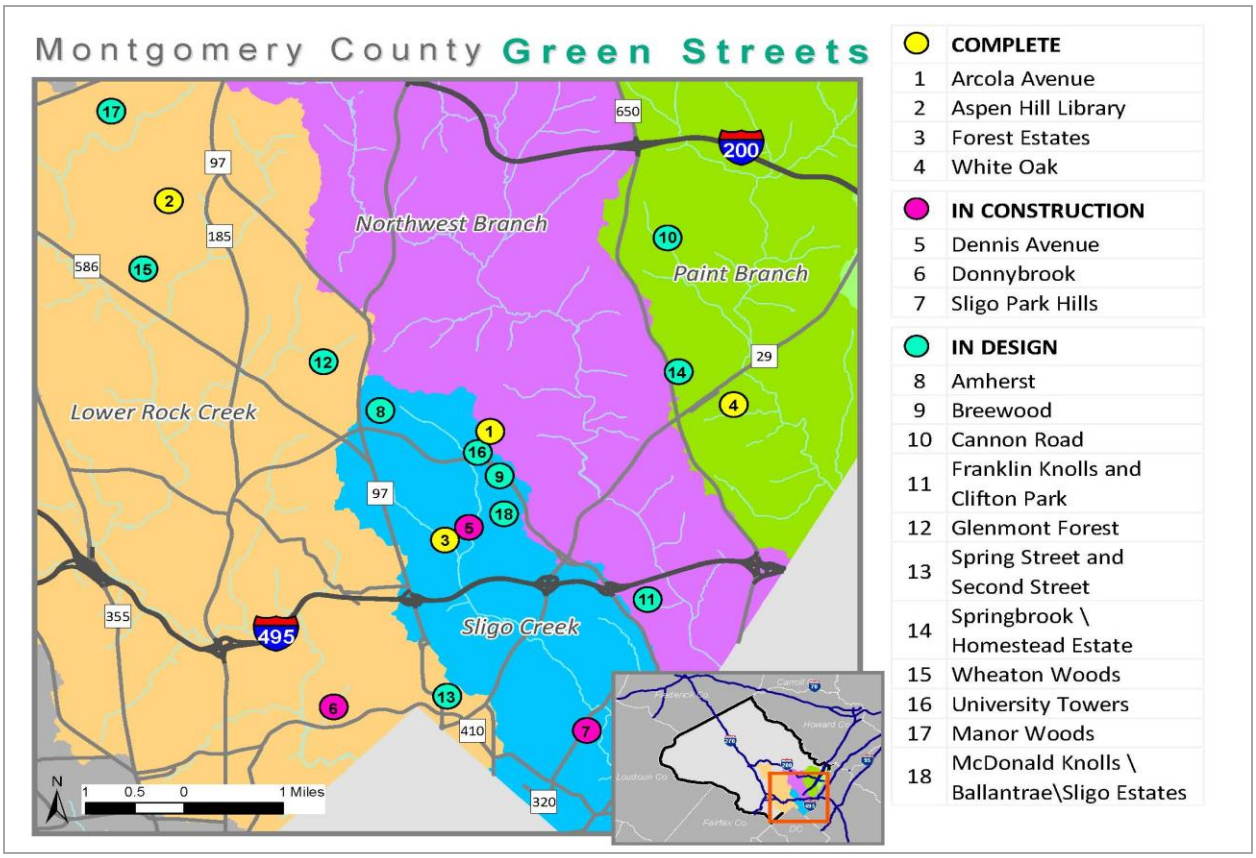


Figure III.G.4. Project Locations and Status of Various Green Streets through FY14

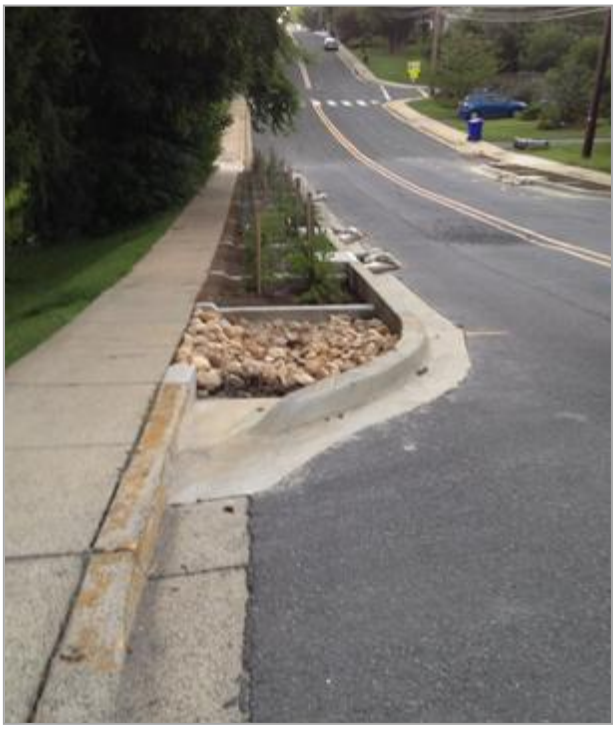


Figure III.G.5. Recently Completed Donnybrook Green Streets Neighborhood Curb Extensions, Located on Grubb Road (Photo taken 7/15/14)

Figure III.G.6. Recently Completed Sligo Park Hills Green Streets Project Located on Wessex Road (Photo taken 9/11/14)

Private Property ESD – RainScapes Program

The DEP's RainScapes program continues to promote and implement environmentally friendly landscaping and small-scale, ESD based stormwater control and infiltration projects on residential, institutional, and commercial properties to reduce stormwater pollution and achieve measurable water quality benefits. Projects are also designed to provide water quantity benefits by controlling, at a minimum, the first inch of rainfall using runoff reduction techniques. DEP offers technical and financial assistance (funded by the County's WQPF) to encourage property owners to implement eligible RainScapes techniques, such as rain gardens, rain barrels or cisterns, conservation landscaping, pavement removal and/or replacement and canopy trees.

RainScapes Rewards provides rebates to private property owners who choose to implement qualified small-scale stormwater projects. Since the program's inception, 1,075 projects have been received and reviewed by the RainScapes team. In FY14, 165 new RainScapes Rewards projects were reviewed for residential and private institutional properties and there was a shift towards more substantial projects, such as permeable paver retrofits rather than smaller water harvesting/rain barrel projects. Of these, 61 were completed, including 10 tree canopy projects which were completed to add 27 more trees. By the end of the FY14, 696 RainScapes Rewards Rebate projects had been completed in the County, with a broad geographic distribution.

RainScapes Rewards Rebate projects provide a visible and distributed presence for stormwater management on private lots across the County and are serving to raise both

public awareness and action. Conservation landscape projects are now being designed to explicitly treat runoff from rooftops and, using a rain garden volume estimate, are being sized to capture the first inch of runoff.

The RainScapes Rewards projects meet or exceed the water quality volume control; in FY14, this added treatment for an additional 2.9 acres of previously uncontrolled impervious area. As a program overall, runoff from over 21 impervious acres is being controlled as of the end of FY14 for at least the first inch of rain; many projects controlled up to the 1-year storm event. Another 3.88 impervious acres will be treated once approved, but not yet complete projects are done. Figure III.G.7 shows a summary of RainScapes Rewards project locations that have been installed Countywide as of the end of FY14.

The volume reduction from the 21 impervious acres does not include the impact from canopy tree planting efforts which will, over time, add additional shading and leaf interception. Canopy trees, while not having a direct metric to measure their impervious area stormwater control contribution or evapotranspiration effectiveness, represent 24.5 percent of installed projects. Since 2008, 694 canopy trees have been planted at 148 sites through the RainScapes Rewards tree incentive. There are an additional 17 tree projects approved for 49 more canopy trees.

As of FY14, the program has been working as a multi-strand program consisting of five identifiable program elements and staff was expanded by one planning professional. All program elements are designed to provide information and training to residents and landscape professionals, as well as incentives and project delivery to County sites. Information on two elements - RainScapes Rewards, and RainScapes Neighborhoods, can be found below. The remaining elements are focused on RainScapes outreach and training, and are described in Part III.E.7, Public Education and Outreach.

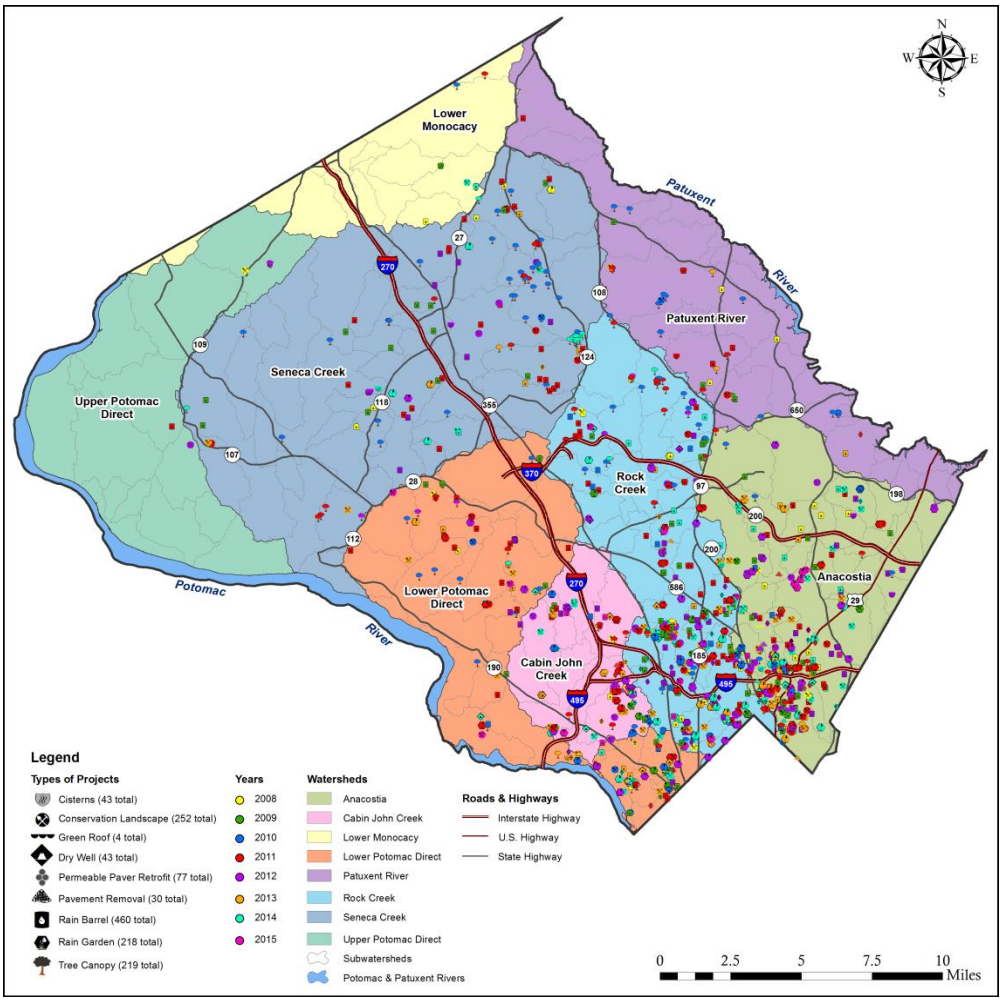


Figure III.G.7. RainScapes Rewards Projects Countywide Through FY14

The RainScapes Neighborhoods Program evaluates small, targeted neighborhood-scale catchments for on-lot stormwater runoff reduction installed by DEP and affiliated watershed groups. This program element targets neighborhoods in priority watersheds with active citizens' group or watershed organizations to leverage education and outreach efforts. Current priority watersheds are in the Anacostia and Rock Creek, with outreach and assessment work beginning in adjacent Lower Potomac subwatershed areas. Project location considerations are also combined when possible with the DOT ROW and DEP watershed restoration projects (for example, Breewood Tributary, Forest Estates and Sligo Park Hills), in order to maximize the amount of runoff reduction achievable. Some projects are located on public property. The Program has a goal of 10 percent to 30 percent participation within a catchment area. This is a very challenging approach to implementation as many owners do not view their property as a source of runoff.

In FY13, 1.2 impervious acres were treated in Forest Estates and Sligo Park Hills, In FY14, additional impervious area was treated by installing projects in the Town of Chevy Chase, Wheaton Woods, and Breewood Neighborhoods, bringing the total for the period from 2008-

2014 to 1.36 impervious acres on private property was treated using the RainScapes Neighborhood approach. Combined with the public property sites and school sites, the total is 4.65 IA treated using community and school based approaches. Most of the public sites were installed as part of the education and outreach initiatives of RainScapes. After program review in the summer of 2013, a change to the program was made to shift to a site assessment and education focus, rather than a direct installation focus. Extensive outreach was conducted in the towns of Somerset and the Town of Chevy Chase, with workshops, individual site assessments prepared for interested property owners, and follow-up design assistance. Each assessment ranked opportunities for RainScapes projects to reduce runoff should the property owner follow through with a RainScapes installation. Participants are encouraged to work with local design professionals to plan and install a RainScapes project using the cost-share RainScapes Rewards Rebate Program. Using this approach, 59 site assessments were completed in Somerset and the Town of Chevy Chase by the end of June. An estimated 1.8 acres of impervious area would be treated with RainScapes projects if installation efforts go forward from these site assessments. Additional outreach is occurring in FY15 to support this effort. Implementation will continue in FY15 and expand into the Four Corner areas of the County and Lower Potomac subwatersheds. Figure III-G.8 shows the locations of the RainScapes Neighborhoods.

Included in the non-Rewards/RainScapes Neighborhoods project treatment numbers are RainScapes demonstration projects which have been installed. Some are private property parcels by the County, specifically at a few churches and on HOA and non-profit properties these projects were placed to provide a locally accessible example so that people could learn about RainScapes and how to install a project on their own property.

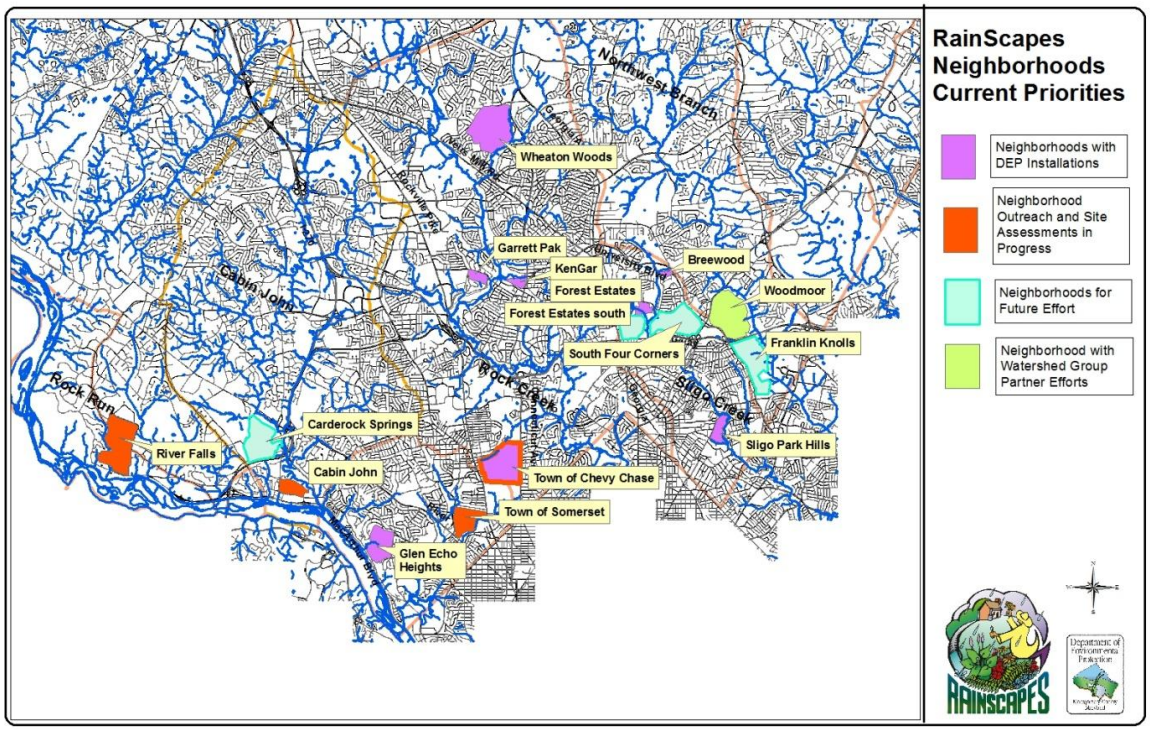


Figure III.G.8. Locations of FY14 RainScapes Neighborhoods

FY14 Watershed Restoration Costs

Watershed Restoration Costs over the Permit Term

The Permit requires the County to submit estimated costs and actual expenditures for watershed restoration program implementation. Table III.G.10 shows a summary of FY10 thru FY14 CIP costs for both watershed assessments and watershed restoration projects.

Table III.G.10. FY10-FY14 Capital Improvement Program Costs for Watershed Assessment and Restoration					
Fiscal Year (FY)	FY10	FY11	FY12	FY13	FY14
Total annual cost for watershed assessment	$433,800	$749,130	$502,244	$879,435	$1,658,517
Total annual cost for watershed restoration	$2,942,100	$3,904,222	$8,168,571	$9,274,295	$16,490,211
Total Costs	$3,375,900	$4,653,352	$8,670,815	$10,153,730	$18,148,728

The Watershed Restoration CIP Budget

During FY14, DEP continued to identify funding sources to support project implementation. The 6-year SWM CIP budget for FY15-FY20 reflect the significant increase in implementation that will be needed to meet the Permit requirement for adding runoff management. As shown in Tables III.G.11 and III.G.12, the approved budget for FY15 is $53,345,000 compared to $35,000,000 for FY14 and $25,000,000 for FY13.

The approved FY15-FY20 SWM Program totals $363.7 million, an increase of $128.7 million, or 55 percent from the amended approved FY13-FY18 program of $235 million. This increase in stormwater management activity will be financed primarily through water quality protection bonds. The debt service for these bonds will be supported by the County's WQPF. The budget assumes $60 million in State aid based on past funding received from the State though grants.

Highlights of the FY15-FY20 SWM CIP Budget include expanded construction of stormwater management facilities, retrofits of old stormwater management facilities, repairs to damaged stream channels and tributaries in stream valley parks and priority watersheds, and structural repairs to County maintained stormwater management facilities. DEP will also expand the design and construction of ESD SWM facilities, County facilities, roads and schools.

Table III.G.11. Department of Environmental Protection Approved (May 2012) FY13-18 Stormwater Management (SWM) Capital Improvement Program Budget (in $)							
Projects	CIP Cycle Total	FY13	FY14	FY15	FY16	FY17	FY18
SWM Retrofit	127,010	11,710	19,700	20,600	20,000	25,000	30,000
SWM Retro-Government Facilities.	11,425	1,125	1,900	2,100	2,100	2,100	2,100

Table III.G.11. Department of Environmental Protection Approved (May 2012) FY13-18 Stormwater Management (SWM) Capital Improvement Program Budget (in $)							
Projects	CIP Cycle Total	FY13	FY14	FY15	FY16	FY17	FY18
Low Impact Development							
SWM Retrofit- Roads	49,425	6,015	7,410	9,000	9,000	9,000	9,000
SWM Retrofit Schools	20,100	1,270	1,010	3270	4,850	4850	4,850
Miscellaneous Stream Valley Improvement	9,870	2,070	2,070	2,070	1,220	1,220	1,220
SWM Facility Planning	6,750	1,150	1,150	1,150	1,100	1,100	1,100
SWM Retrofit Anacostia	1,620	310	310	310	230	230	230
Major Structural Repair	8,800	1,350	1,450	1,500	1,500	1,500	1,500
Total	**235,000**	**25,000**	**35,000**	**40,000**	**40,000**	**45,000**	**50,000**

Table III.G.12. Department of Environmental Protection Approved (May 2014) FY15-20 Stormwater Management (SWM) Capital Improvement Program Budget (in $)							
Projects	CIP Cycle Total	FY15	FY16	FY17	FY18	FY19	FY20
SWM Retrofit	146,470	18,726	22,968	23,408	23,732	27,696	29,940
SWM Retro-Government Facilities. Low Impact Development	17,732	3,026	2,816	2,820	3,270	2,900	2,900
SWM Retrofit- Roads	98,420	12,740	14,080	26,320	16,010	15,170	14,100
SWM Retrofit Schools	24,930	3,470	6,280	3,480	3,900	3,900	3,900
Miscellaneous Stream Valley Improvement	42,573	6,393	5,440	9,640	8,900	6,100	6,100
SWM Facility Planning	8,400	1,150	1,250	1,350	1,450	1,550	1,650
SWM Retrofit Anacostia	2,060	310	350	350	350	350	350
Major Structural Repair	23,070	7,530	3,540	3,000	3,000	3,000	3,000
Total	**363,655**	**53,345**	**56,724**	**70,368**	**60,612**	**60,666**	**61,940**

Progress Towards Meeting Wasteload Allocations for EPA Approved TMDLs

The Permit requires development of implementation plans to meet County MS4 WLAs for any EPA approved TMDL in County watersheds within 1 year of EPA approval. The County must also report progress towards meeting those WLAs where watershed restoration is occurring. Implementation plan development is addressed in Part III. J. Total Maximum Daily Loads of this report.

The County successfully submitted the Strategy to meet Permit requirements, including meeting the TMDL WLAs, in February 2011, 1 year after issuance of the Permit. The Strategy used the WTM to verify pollutant baseline loads in TMDL watersheds, and estimate pollutant load reductions of a variety of completed and planned structural, non-structural, and programmatic watershed restoration practices. Pollutant load reduction efficiencies were selected based on the best information available during model development. The model estimated pollutant treatment by SWM BMPs and retrofits constructed after TMDL baseline years. Details on the WTM assumptions can be found in the *Montgomery County Coordinated Strategy, Appendix B, Modeling Framework*, which can be found in Appendix J.

Table III.G.13, below summarizes watershed-specific TMDLs and pollutant reductions achieved by watershed restoration projects constructed after TMDL baseline data date. The reductions include nutrients and sediment reductions from stream restoration projects using efficiencies provided in MDE's August 2014 *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated*. The FY14 pollutant load reduction information can also be found in this report's electronic (CD) attachment in Appendix A, MDENPDES14.mbd, Parts G., G.1., and G.3.

The Strategy land cover loading rates and BMP reduction efficiencies do not match those published in the subsequent August 2014 MDE guidance. DEP has been working to update impervious area data, along with updating urban BMP data to include over 1,000 new structures with their delineated drainage areas. Once the data is complete, DEP will run the WTM again and address the inconsistencies by correcting the WTM assumptions. This iterative approach will refine the current pollutant reduction estimates and lead to a clearer picture of the reductions associated with the County's watershed restoration efforts.

Table III.G.13. TMDL Summary by Impairment									
Impairment	Watershed	Issue Date	Pollutant	County MS4 Baseline Load	Annual Allocation	Units	WLAsw Percent Reduction	Percent Reduction Since Baseline Date*	TMDL Baseline Data Date
Bacteria	Cabin John Creek	2007c	E. coli	44,257	30,670	(Billion MPN/yr)	30.7%	0.40%	2003
	Rock Creek	2007d	Enterococci	453,669	18,195	(Billion MPN/yr)	96.0%	3.50%	2003
	Anacostia River	2007b	Enterococci	247,809	29,978	(Billion MPN/yr)	87.9%	5.10%	2003
	Lower Monocacy River	2009e	E. coli	67,452	9,848	(Billion MPN/yr)	85.4%	1.00%	2003-2004
Sediments	Anacostia River	2007a	TSS	7,682	1,101	(tons/yr)	87.5%	129.10%	1997
	Triadelphia Reservoir	2008b	TSS	29	29	(tons/yr)	0.0%	0.02%	2003
	Clopper Lake	2002	TSS	13	13	(tons/yr)	0.0%	0.00%	2002
	Lower Monocacy River	2009d	TSS	253	99	(tons/yr)	60.8%	2.0%	2000
	Seneca Creek	2011	TSS	5,735	3,185	(tons/yr)	44.6%	21.00%	2005
	Rock Creek	2011	TSS	8,667	5,345	(tons/yr)	38.3%	50.60%	2005
	Cabin John Creek	2011	TSS	3,143	2,430	(tons/yr)	22.7%	20.00%	2005
	Potomac River Direct	2011	TSS	4,365.00	2,783.20	(tons/yr)	36.20%	2.00%	2005
Nutrients	Clopper Lake	2002	Phosphorus	101	55	(lbs/yr)	45.4%	0.00%	2002
	Anacostia River	2008a	Nitrogen	206,312	38,959	(lbs/yr)	81.8%	9.00%	1997
	Anacostia River	2008a	Phosphorus	20,953	3,947	(lbs/yr)	81.2%	29.00%	1997
	Triadelphia Reservoir	2008b	Phosphorus	438	373	(lbs/yr)	15.0%	0.30%	2003
	Rocky Gorge Reservoir	2008b	Phosphorus	4,268	3,628	(lbs/yr)	15.0%	2.00%	2003
	Lower Monocacy River	2013	Phosphorus	1,872	1,305	(lbs/yr)	30.0%	0.00	2009
	Rock Creek	2013	Phosphorus	12,503	8,089	(lbs/yr)	35.0%	0.98%	2009

Table III.G.13. TMDL Summary by Impairment									
Impairment	Watershed	Issue Date	Pollutant	County MS4 Baseline Load	Annual Allocation	Units	WLAsw Percent Reduction	Percent Reduction Since Baseline Date*	TMDL Baseline Data Date
Trash	Anacostia River	2010	Trash	228,683	-	lbs/yr removed	100.0%	10.90%	2010
PCB	Anacostia River - Non Tidal-NWB	2011	PCB	134.5**	2.56	g/yr	98.1%		
PCB	Anacostia River - Non Tidal-NEB	2011	PCB	112.57**	1.53	g/yr	98.6%		

Adapted from "2010 Status of Approved Stormwater Wasteload Allocations for NPDES Regulated Stormwater Entities in Montgomery County," April 27, 2010 by Jeff White, MDE, and additional email 11/13/13

**Percent reduction of pollutant by BMPs completed after the TMDL baseline data collection period, as of FY14*

***For all known NPDES stormwater discharges in Montgomery County portions of the NEB and the NWB, as identified in the TMDL*

H. Assessment of Controls

The Permit requires the County to assess the effectiveness of its stormwater management program and control measures using pre-restoration and post restoration watershed monitoring, which includes chemical, physical and biological monitoring. The County must also document progress towards meeting the watershed restoration goals identified in Part III.G and any applicable WLAs developed under the EPA approved TMDLs. DEP is responsible for requirements under this part of the Permit.

Breewood Tributary Restoration Project

The DEP targeted the Breewood tributary for comprehensive watershed restoration efforts. In 2009, MDE approved DEP's proposal to conduct pre and post restoration monitoring required in Part III.H.1, Watershed Restoration Assessment, to assess effectiveness of the Breewood tributary restoration efforts.

The tributary is located within the Sligo Creek subwatershed of the Anacostia River watershed as shown on Figure III.H.1. Figure III.H.2 shows the Breewood tributary drainage area and locations of chemical, physical and biological monitoring stations. The Breewood tributary is a 1,200-foot first order stream in a small catchment (63 acres) containing 35 percent impervious.

The catchment is predominantly medium density (quarter acre) residential, and also contains a condominium complex, townhouse development, senior living center, high school and church. There are two primary roads, University Boulevard and Arcola Avenue in the upper portion of the catchment. Curb and gutter designed streets support residential development located in the middle and lower sections of the catchment. The majority of the stormwater runoff from the impervious areas is not controlled and has led to a severely unstable stream channel which transports sediment, and other associated pollutants downstream.

The DEP's Breewood Tributary Restoration Project is an innovative comprehensive management approach which will link neighborhood outreach and upland watershed source control measures to achieve measurable water quality improvements. Stormwater control measures will include ESDpractices with stream and wetland restoration. The outreach efforts will focus on increasing resident awareness and active stewardship to protect the tributary and associated local park from trash and runoff pollutants. In FY14, DEP launched a website dedicated to the entire project where project details, information, and status updates are shared. The webpage is located at: http://www.montgomerycountymd.gov/DEP/Restoration/breewood.html

The DEP is currently designing 14 right of way ESD practices along residential roads and promoting RainScapes techniques to address runoff from 54 residential properties. Phase 2 of the project is underway and includes the design of 1,200 linear feet of stream restoration and a ESD project on a larger private property bordering the residential properties.

The stream restoration project will:

- stabilize the banks to prevent erosion,
- add new trees and plants,
- reduce the amount of sediment entering Sligo Creek,
- improve water quality in both the Breewood Tributary and Sligo Creek,

- reconnect the stream to its floodplain, and
- improve the ecological health of the Breewood Tributary and adjacent floodplain areas.

A summary of projects proposed for the Breewood tributary is on the electronic attachment in Appendix L. Figure III.H.3 shows the locations of the restoration projects.

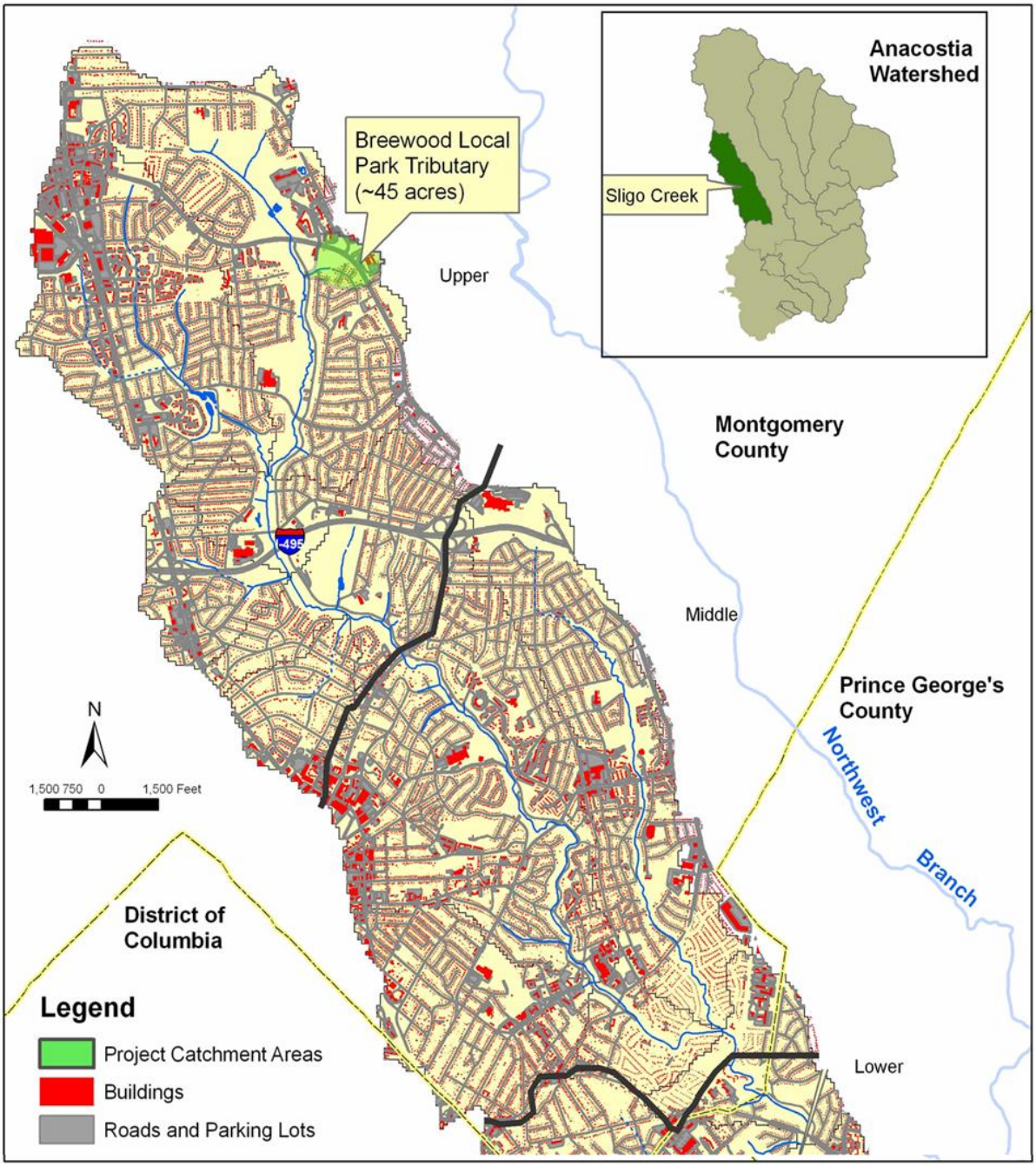


Figure III.H.1. Location of the Breewood Tributary within the Sligo Creek Subwatershed of the Anacostia. Note that the actual size of the Breewood tributary drainage area is 63 acres according to a recent recalculation.

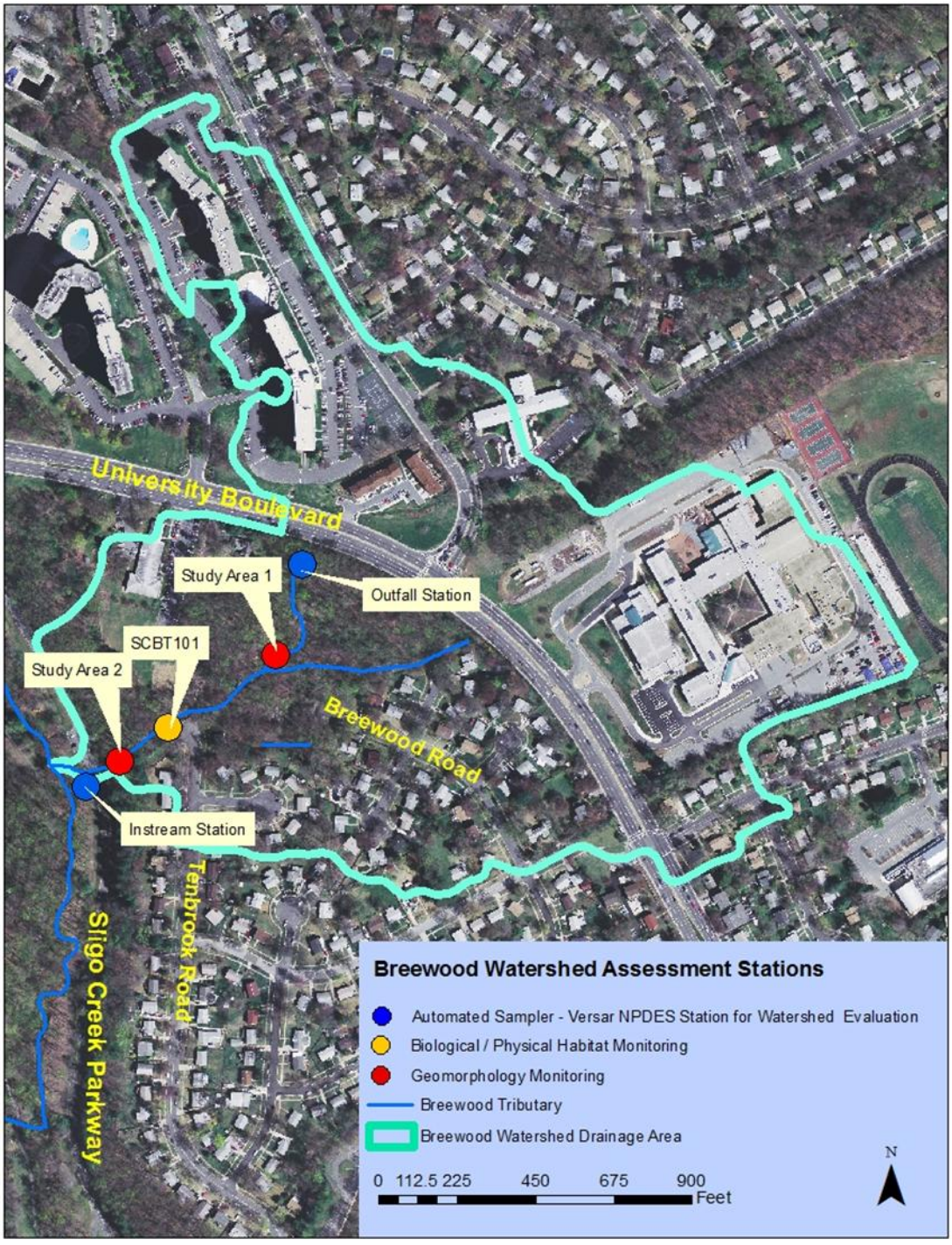


Figure III.H.2. Locations of Stream Chemistry, Biological, Physical Habitat and Geomorphology Monitoring Stations, Breewood Tributary of Sligo Creek

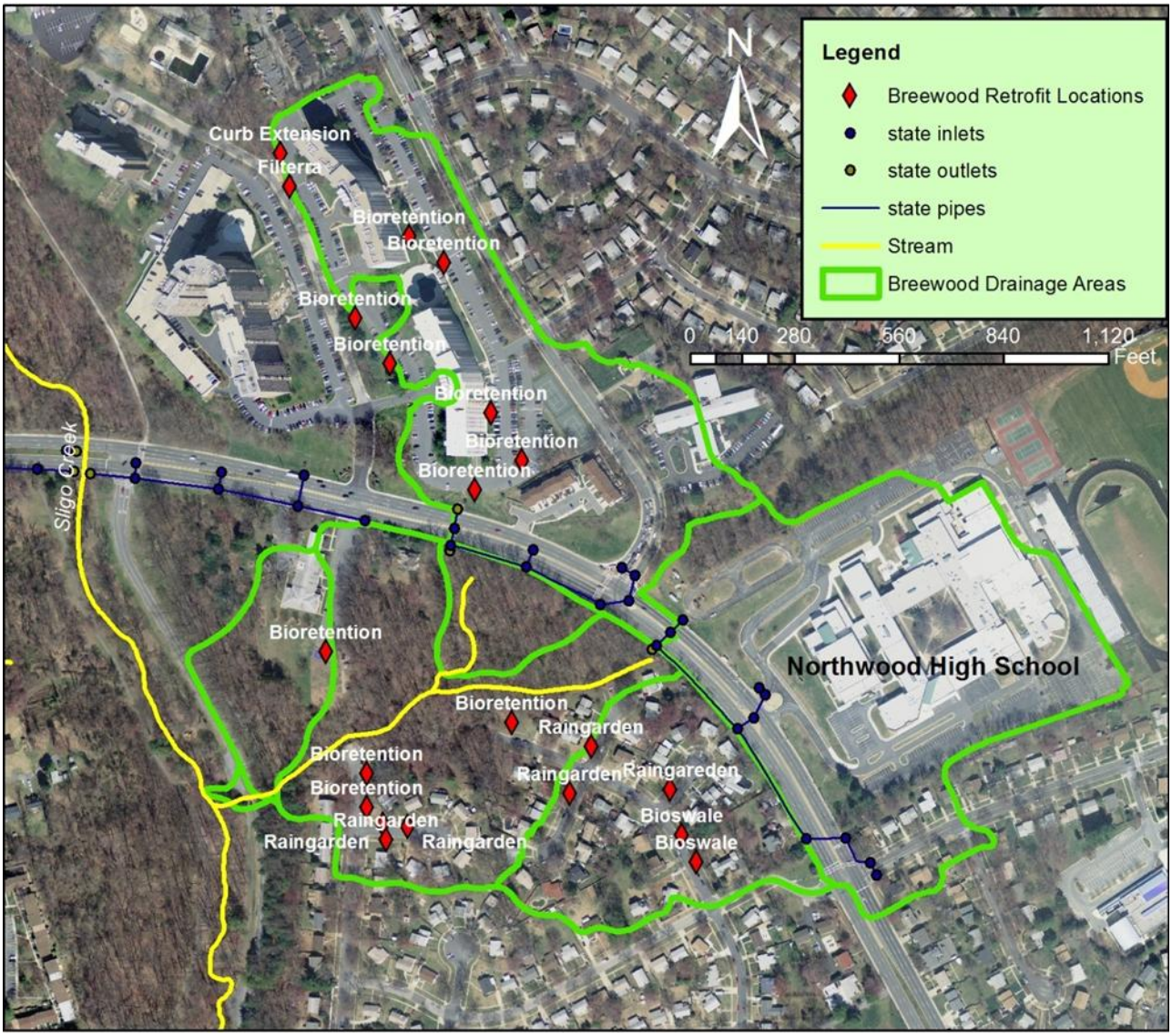


Figure III.H.3. Locations of the Breewood Tributary Restoration Projects

H.1 Watershed Restoration Assessment

Breewood Tributary Chemical Monitoring

During 2013, DEP continued water chemistry monitoring in the Breewood tributary at one storm drain outfall draining University Boulevard and points north (the outfall station) and an instream station downstream of a culvert underneath Sligo Creek Parkway (the instream station), as shown on Figure III.H.2. A continuously recording rain gauge is located at the Wheaton Branch stormwater ponds in Silver Spring, approximately 1 mile southwest of the monitoring stations.

The Permit required chemical monitoring data is included electronically in Appendix A, MDENPDES14.accdb, Part F. The summary report *NPDES Water Chemistry Monitoring in the*

Breewood Tributary of Upper Sligo Creek 2009-2013 is also included in the electronic attachment in Appendix K.

Table III.H.1 shows the drainage area to each water chemistry station. Table III.H.2 shows the contribution of impervious land uses to total impervious area in the drainage area.

Table III.H.1. Drainage Area to Breewood Water Chemistry Monitoring Stations	
Location	Acres
Total DA to the outfall water chemistry station	16.9
Total DA to the instream water chemistry station	62.9
Total DA	63

Table III.H.2. Breewood Tributary Impervious Area 2012				
Impervious	Property Type	Acres	Percent of Impervious Area	Percent of Watershed
Buildings (Includes accessory structures)		8.12	31%	13%
	Multi-family Residence	1.02	4%	2%
	Non Residential	0.53	2%	1%
	Residential Single Family Attached	0.25	1%	0%
	Residential Single Family Detached	1.96	7%	3%
	School	4.36	16%	7%
Parking/Driveway		11.69	44%	19%
	Multi-family Residence	4.01	15%	6%
	Parks and Planning	0.02	0%	0%
	Non Residential	1.23	5%	2%
	Right of Way	0.24	1%	0%
	Residential Single Family Attached	0.09	0%	0%
	Residential Single Family Detached	0.57	2%	1%
	School	5.54	21%	9%
Road		6.09	23%	10%
	Road	6.09	23%	10%

Table III.H.2. Breewood Tributary Impervious Area 2012				
Impervious	Property Type	Acres	Percent of Impervious Area	Percent of Watershed
All other impervious		0.72	3%	1%
	Multi-family Residence	0.54	2%	1%
	Right of Way	0.10	0%	0%
	Residential Single Family Detached	0.08	0%	0%
Grand Total		26.63	100%	42%

Hydrology Modeling

The Permit requires that rainfall to runoff characteristics of the contributing watershed be evaluated using a standard, accepted hydrology model. The County produced a Hydrologic Engineering Center River Analysis System (HEC-RAS) model of the Breewood Tributary watershed as part of the stream restoration design process. The model was completed in FY14.

Summary of Water Chemistry Monitoring Results

The DEP's contractor installed the monitoring stations, performed water chemistry monitoring (e.g., metals, nutrients), water quality monitoring (e.g., pH, specific conductivity, temperature, dissolved oxygen), continuous flow monitoring, and continuous rainfall monitoring according to methods described in the Quality Assurance and Quality Control Document for Water Chemistry Monitoring at Breewood Road Tributary (Hage and Jones 2010). Field teams collected baseflow samples monthly and conducted automated storm runoff monitoring, targeting three events per quarter. A total of 41 storms and 55 baseflow events were monitored from 2009 through 2013. For each storm event, samples were collected along the rising, peak, and falling limbs of the hydrograph and then subsequently, a storm EMC calculated from the results of these three samples.

Drainage area size and land use to both the outfall and instream stations affected flow rate, total stormflow volume, and response of flow to rainfall. As expected for rain events, rise in stream stage at the instream station occurred later than the first appearance of flow at the outfall station. Stormflow appears at the outfall faster because its drainage area contains higher percentages of impervious area and connectivity. Flow rate values and total stormflow volumes were generally greater at the instream station as expected given its greater drainage area. The instream station also is somewhat less responsive to small events because of the relatively lower amount of impervious area and greater travel time through the system.

For each station, baseflow MC were calculated for all Permit- required parameters over the 5-year monitoring period.

Storm EMCs represent the weighted average pollutant concentrations based on samples collected at discrete intervals during a storm. EMCs were calculated and averaged over the 5-year monitoring period for each parameter except TPH and Enterococcus. Stormflow samples for

these parameters were collected only during first flush so MCs were calculated rather than EMCs. The average EMCs and MCs (Table III.H.3) of each parameter at each station were compared:

- Storm samples generally had higher concentrations of pollutants at the outfall than at the instream station.
  - Mean storm EMCs for 5-day biochemical oxygen demand (BOD), total Kjeldahl nitrogen (TKN), copper, zinc, and storm MCs for TPH, and Enterococcus were higher at the outfall than at the instream station.
- At the instream station, there was not a consistent relationship between flow type and results.
  - Mean storm EMCs were higher than baseflow MCs for BOD, TKN, TP, total suspended solids (TSS), and metals.
  - First flush storm MCs were higher than baseflow MCs for TKN and *Enterococcus*.
  - Mean storm EMCs were lower than baseflow MCs for nitrate plus nitrite, and hardness.
- At the outfall station, it was not possible to relate results to flow type.
  - The outfall station was generally dry, except following rainfall or other activities in the catchments. Baseflow samples could only be obtained on three occasions. In these samples, the baseflow MCs for Enterococcus and TPH were lower than stormflow MCs.

Table III.H.3. Mean Storm EMCs and Baseflow MCs (± 1-sigma standard deviation) in Breewood Tributary, 2009-2013. All results in mg/l, except for Enterococcus (MPN/100 ml)

Analyte	Mean Storm EMC		Baseflow MC	
	Outfall	Instream	Outfall	Instream
Biochemical Oxygen Demand (5-day)	5.3 ± 4.6	4.3 ± 3.6	13.1 ± 10.2	0.2 ± 0.7
Ttotal Kjeldahl Nitrogen	0.940 ± 0.690	0.807 ± 0.546	2.500 ± 1.959	0.085 ± 0.229
Total Phosphorus	0.037 ± 0.065	0.064 ± 0.127	0.000 ± 0.000[(b)]	0.000 ± 0.000[(b)]
Nitrate+Nitrite	0.345 ± 0.236	0.549 ± 0.275	1.806 ± 2.508	2.630 ± 0.202
Total Suspended Solids	56.6 ± 61.7	148.2 ± 133.3	36.4 ± 23.2	2.8 ± 4.1
Total Cadmium	0.000000 ± 0.000003[(c)]	0.000001 ± 0.000005[(c)]	0.00000 ± 0.00000[(b)]	0.00000 ± 0.00000[(b)]
Total Copper	0.030 ± 0.018	0.022 ± 0.012	0.217 ± 0.188	0.008 ± 0.013
Total Lead	0.007 ± 0.008	0.012 ± 0.012	0.006 ± 0.003	0.0004 ± 0.0022[(c)]
Total Zinc	0.085 ± 0.050	0.056 ± 0.035	0.438 ± 0.626	0.016 ± 0.006
Total Petroleum Hydrocarbon[(a)]	3 ± 4	1 ± 2	4 ± 3	1 ± 3

Table III.H.3. Mean Storm EMCs and Baseflow MCs (± 1-sigma standard deviation) in Breewood Tributary, 2009-2013. All results in mg/l, except for Enterococcus (MPN/100 ml)				
Analyte	Mean Storm EMC		Baseflow MC	
	Outfall	Instream	Outfall	Instream
Enterococcus[(a)]	11,910 ± 31,545	1,285 ± 2,931	1,073 ± 1,212	274 ± 508
Hardness	34 ± 17	43 ± 15	174 ± 156	108 ± 9

[(a)]EMCs are not calculated for TPH or Enterococcus. These values are arithmetic averages of first flush grab results.

[(b)]Analytical results below detection limits and therefore means set to zero.

[(c)]Additional digits added to storm EMC and baseflow MC results to illustrate difference in results.

Analysis of the flow and water chemistry data collected for this project will be used to evaluate the effectiveness of watershed restoration efforts at improving hydrology and water chemistry. Data collected to date document baseline conditions, prior to retrofit construction. In the future, a variety of approaches will be employed to evaluate retrofit effectiveness, including analyzing changes in hydrograph sensitivity to rainfall and annual pollutant loadings.

Annual Pollutant Loadings

Annual pollutant loadings for each station during 2013 were computed from separate baseflow annual loadings and stormflow annual loadings. Stormflow annual load for a given parameter at each station was determined by multiplying the average annual EMC (in mg/l) by the total annual stormflow discharge (in CF) and converting units. Baseflow annual load was determined by multiplying the average annual baseflow MC by the total annual baseflow discharge. The total annual baseflow discharge was obtained by separating baseflow values from the flow rate data record. The total annual stormflow discharge was determined by subtracting total annual baseflow discharge from the total annual discharge (determined by plotting the annual hydrograph in Flowlink). Loading values were calculated from baseflow MCs, stormflow MCs and stormflow EMCs and are presented in Table III.H.4. reported in the electronic attachment to this report, Appendix A., MDENPDES14.accdb, Part G.2. Pollutant Loads Associated with GIS Coverage.

Table III.H.4. Baseflow, Stormflow, and Total Annual Loadings (lbs.) in Breewood Tributary, 2013						
Analyte	Stormflow Loading		Baseflow Loading		Total Loading (Stormflow plus Baseflow)	
	Outfall	Instream	Outfall	Instream	Outfall	Instream
Biochemical Oxygen Demand (5-day)	792	1,418	NS	0[(a)]	792	1,418
Total Kjeldahl Nitrogen	131	261	NS	0.018	131	261
Total Phosphorus	5	12	NS	0[(a)]	5	12

Table III.H.4. Baseflow, Stormflow, and Total Annual Loadings (lbs.) in Breewood Tributary, 2013						
Analyte	Stormflow Loading		Baseflow Loading		Total Loading (Stormflow plus Baseflow)	
	Outfall	Instream	Outfall	Instream	Outfall	Instream
Nitrate+Nitrite	42	158	NS	1	42	159
Total Suspended Solids	5,999	34,508	NS	0.943	5,999	34,509
Total Cadmium	0[(a)]	0[(a)]	NS	0[(a)]	0[(a)]	0[(a)]
Total Copper	4	7	NS	0.002	4	7
Total Lead	1	5	NS	0[(a)]	1	5
Total Zinc	13	22	NS	0.006	13	22
Total Petroleum Hydrocarbons	102	0[(a)]	NS	0[(a)]	102	0[(a)]
Enterococcus	541,274	157,611	NS	122	541,274	157,733
Hardness	4,002	12,321	NS	42	4,002	12,363

[(a)] Zero load indicates all concentration data below detection limits.

NS = no concentration data collected during baseflow events at the outfall station.

Continuous Water Quality Monitoring

In June 2014, DEP began continuous monitoring at the instream and outfall station for dissolved oxygen, specific conductivity, temperature, and turbidity. Through this monitoring, DEP hopes to gain additional information on the nature of the stream biological community degradation, specifically any effect due to dissolved oxygen concentration.

Breewood Tributary Biological Monitoring

In March 2010, DEP established a biological monitoring station (SCBT101) in the Breewood tributary. As shown on Figure III.H.2, the station is located upstream of the Sligo Creek Parkway and the instream water chemistry monitoring station. Station SCBT101 is monitored each spring for benthic macroinvertebrates. No fish monitoring is conducted because of the extremely small drainage area of the tributary.

The DEP uses a BIBI to assess stream conditions at SCBT101. Pre-restoration benthic community analysis will be compared with post-restoration data to help evaluate watershed restoration success. DEP will analyze eight metrics of benthic macroinvertebrate community composition and function. The metrics include examining the percentage of functional feeding groups (FFGs) present, evaluating taxa richness, taxa composition, and pollution tolerance. Each measurement responds in a predictable way to increasing levels of stressors. Changes in the metrics will be seen as the biological community improves and may be seen before the overall BIBI score increases.

FFG classifications organize benthic macroinvertebrates by their feeding strategies (Camann, 2003 and Cummins in Loeb and Spacie, 1994). The five FFGs usually examined in a bioassessment are *collector gatherers, filtering collectors, shredders, scrapers, and predators*. Collector gatherers are the most generalized in feeding and habitat needs and are usually the most abundant FFG because their food source of fine particulate organic matter is abundant. Shredders reduce coarse material (like leaves) into fine material which can then be transported downstream for use by collectors. Shredders are considered specialized feeders and sensitive organisms and are typically well-represented in healthy streams (U.S. EPA 2008). Other FFGs include scrapers and predators. Scrapers scrape and graze on diatoms and other algae, are sensitive to environmental degradation and are associated with high quality streams. Predators attack and consume other insects and macroinvertebrates.

In 2010, the BIBI score for the tributary was 14 out of a possible 40, indicating a *poor* benthic community. Only six taxa were present, indicating low species richness. Shredders accounted for only 2 percent of the total sample collected at SCBT101 and no scrapers were found. Collector gatherers accounted for 57 percent of the sample collected at SCBT101. Filterers accounted for 3 percent and predator organisms composed 38 percent of the total sample.

In 2011, the BIBI score for the tributary was 18 out of a possible 40, indicating a *fair* benthic community. There were 14 taxa present, indicating moderate species richness. Shredders accounted for 11 percent of the total sample collected at SCBT101 and no scrapers were found. Collector gatherers accounted for 52 percent of the sample collected at SCBT101. Filterers accounted for 6 percent and predator organisms composed 31 percent of the total sample.

In 2012, the BIBI score for the tributary was 14 out of a possible 40, indicating a *poor* benthic community. There were thirteen taxa present, indicating moderate species richness. Shredders accounted for 2 percent of the total sample collected at SCBT101 and no scrapers were found. Collector gatherers accounted for 64 percent of the sample collected at SCBT101. Filterers accounted for 4 percent and predator organisms composed 26 percent of the total sample.

In 2013, the BIBI score for the tributary was 16 out of a possible 40, indicating a *poor* benthic community. There were 19 taxa present, indicating moderately high species richness. Shredders accounted for 5 percent of the total sample collected at SCBT101, but like in 2012 no scrapers were found. Collector gatherers accounted for 70 percent of the sample collected at SCBT101. Filterers accounted for 6 percent and predator organisms composed 17 percent of the total sample.

Figure III.H.4 shows the average proportion of each FFG at SCBT101 and in a reference stream reach, the Good Hope tributary to Paint Branch (PBGH108). The benthic community of PBGH108 was rated *good* in 2010 and *fair* in 2011 thru 2013. Note that the relative percentage of predator taxa decreases and the percentages of filterer, shredder, and scraper taxa increases with an increase in benthic community rating.

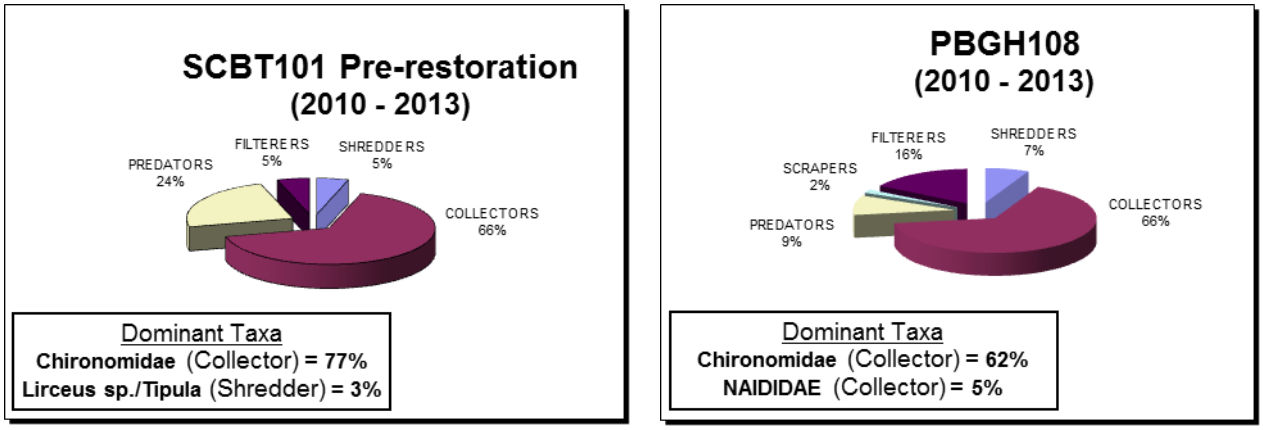


Figure III.H.4. Functional Feeding Group Comparison in the Breewood Tributary (SCBT101) and in the Good Hope Tributary (PBGH108)

The DEP used additional metrics to characterize the benthic macroinvertebrate community of the Breewood tributary in 2013. The biotic index, which measures tolerance to organic pollution, was 7.05 (out of 10), indicating a relatively high tolerance to organic pollution. In addition, the dominant taxa in the Breewood assessment were members of the Chironomidae (midge) family, which tend to be tolerant of pollution and other environmental stressors (Pedersen and Perkins 1986; Jones & Clark 1987). DEP identified a steady decline in the percent of Chironomidae in the samples (down from 91 percent in 2011 to 62 percent in 2013), but not an obvious cause. The BIBI score analysis also includes determining the presence of EPT taxa (commonly known as mayfly, stonefly, and caddisfly) which are sensitive species commonly associated with high quality streams. In the 2013 Breewood tributary benthic macroinvertebrate sample, there were very few EPT taxa present.

Breewood Tributary Physical Habitat Assessment

Starting in 2010, DEP performed yearly physical habitat assessments at SCBT101. Pre-restoration monitoring will establish a baseline for comparison with future habitat assessments. Results indicate that the habitat is consistently rated fair, receiving a score of 77 (out of a possible 200) in 2013. Scores from 2010 to 2012 ranged from 71 to 97. DEP found that the stream has poor riffle quality, high embeddedness values, bank instability, and a narrow riparian zone, which lowered the overall habitat score. DEP observed an increase in riffle quality in 2011 and 2012, which contributed to the overall increase in habitat score. In 2013, however; DEP noted reduced riffle quality, and higher embeddedness due in part to pre-restoration activities, and overland flow diverted from a non-functioning storm drain. Figure III.H.5 shows a comparison of the Breewood tributary BIBI and habitat conditions with those in the Paint Branch reference stream reach from 2010 to 2013.

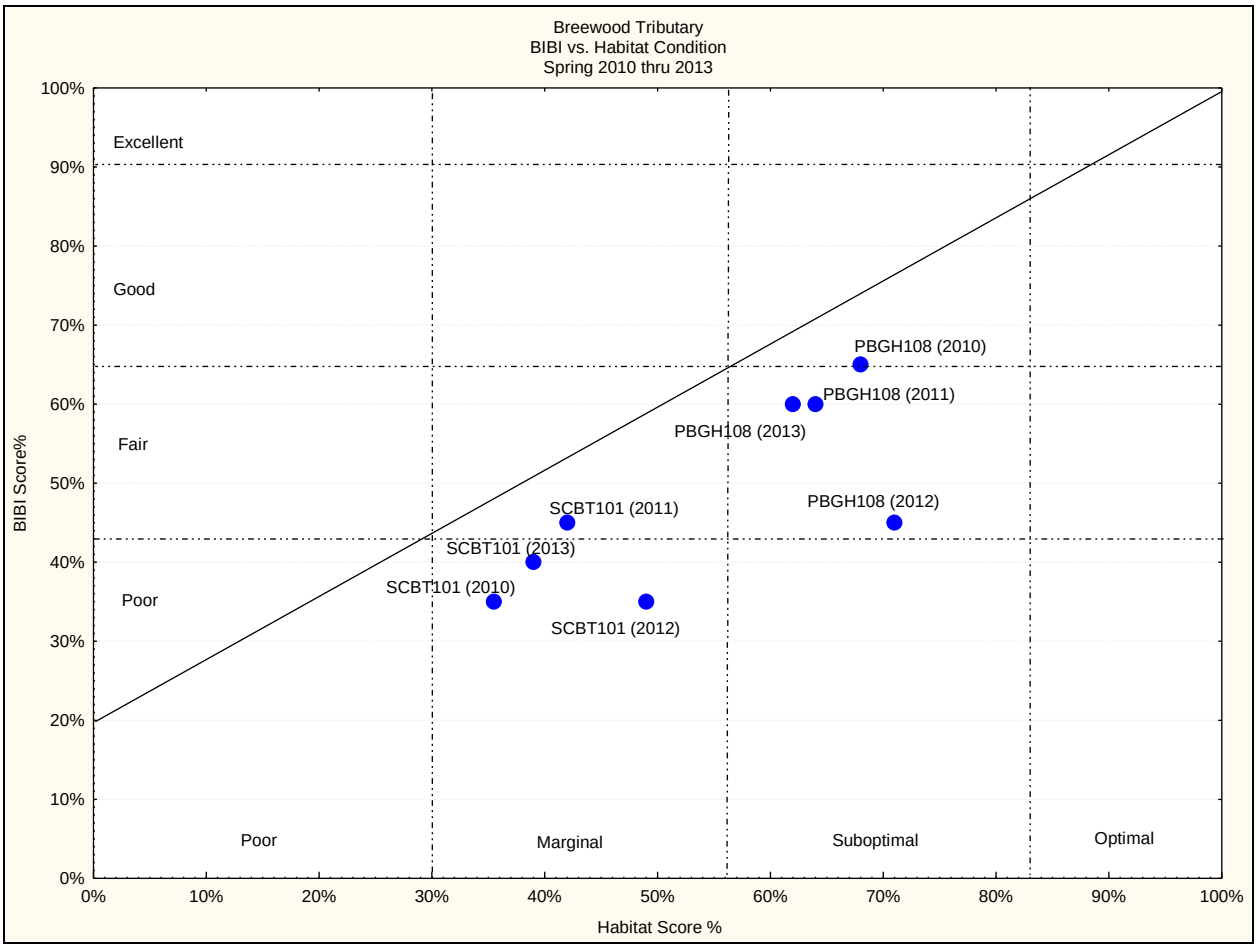


Figure III.H.5. BIBI vs. Habitat Condition at Breewood Tributary and Reference Stream, Spring 2010 thru Spring 2013

The DEP field team recorded in-situ water chemistry measurements in the Breewood tributary and the reference stream concurrent with the physical habitat assessment. As shown in Table III.H.5, most water quality parameters (dissolved oxygen, pH and temperature) were within the expected range at SCBT101 and the reference stream. Conductivity was the only parameter which differed among the streams, being elevated (966 umhos) at SCBT101 compared to 212 umhos at the reference stream. Salt in road runoff from the University Blvd. outfall upstream of the station is the most likely explanation for the unusually high conductivity values noted in 2013. Conductivity values will continue to be tracked to evaluate if this is a consistent pattern and therefore a chronic influence on the benthic community.

Table III.H.5. In-Situ Water Chemistry Results at Breewood Tributary (SCBT101) and at the Good Hope Tributary (PBGH108) Reference Stream									
Station	Type	Benthic Community Rating	Date	Dissolved Oxygen (>5mg/l)	% Dissolved Oxygen Saturation	pH	Conductivity (<= 300 umhos)	Air Temp. (deg C)	Water Temp. (deg C)
SCBT101	Benthic	Poor	5/7/2010	8.73	87	7.30	566	21	15.4
SCBT101	Benthic	Fair	3/9/2011	10.57	87	7.83	727	5	7.8
SCBT101	Benthic	Poor	3/19/2012	10.35	90	5.9	565	22	14.3
SCBT101	Benthic	Poor	3/21/2013	9.05	83	7.56	966	12	12.0
PBGH108	Benthic	Good	4/22/2010	10.69	90	6.24	166	12	11.0
PBGH108	Benthic	Fair	4/18/2011	10.60	104	6.79	143	17	14.4
PBGH108	Benthic	Fair	4/11/2012	11.27	110	7.36	157	14	10.6
PBGH108	Benthic	Fair	3/20/2013	12.31	102	6.27	212	9	7.2

Breewood Tributary Physical Geomorphic Assessment

In 2010-2011, DEP established two study area for physical geomorphic monitoring (20-bankfull widths) in the Breewood tributary (Figure III.H.2). Study Area 2 extends downstream from the end of Tenbrook Drive to just upstream from Sligo Creek Parkway and includes the biological monitoring station at SCBT101. A second study area (Study Area 1) extends from the outfall channel below University Boulevard to the Breewood tributary.

Figure III.H.6 provides representative cross section views of Study Area 1. In 2011, the average particle size of the channel substrate below the bankfull channel height was 0.062 mm, which is classified as fine sand. In 2012 and 2013, the average particle size of the channel substrate below the bankfull channel height was slightly coarser, at 0.65 mm in 2012 and 0.55 in 2013, which is classified as coarse sand. This area of the stream is predominated by riffles and runs. In 2011, riffles accounted for 39 percent of the reach surveyed and runs accounted for 38 percent of the reach surveyed. In 2012 and 2013, riffles accounted for approximately 48 percent of the reach surveyed and runs accounted for 31 percent of the reach surveyed. The results of the survey indicate a degraded channel with low sinuosity, and high erosion potential.

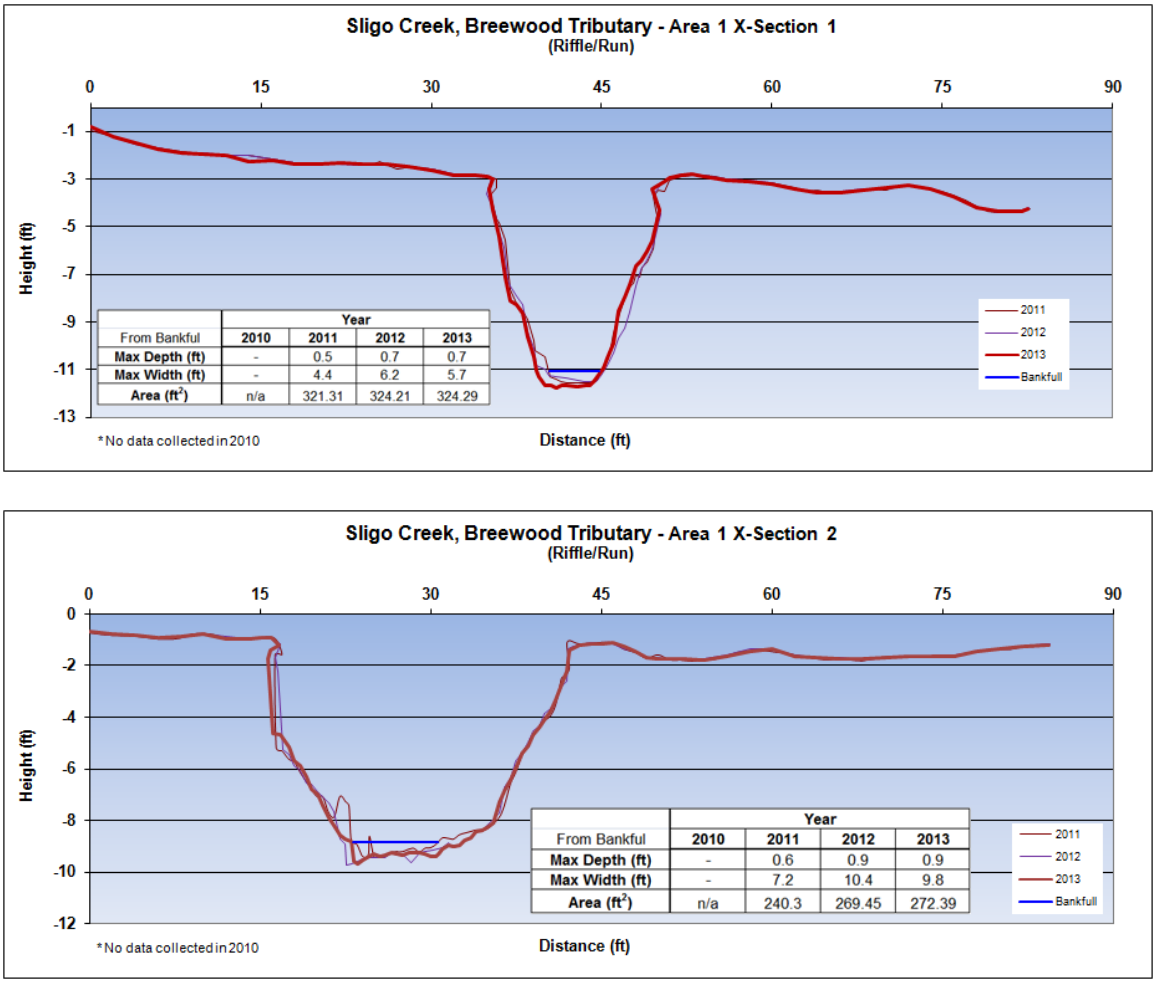


Figure III.H.6. Representative Cross Sections from Breewood Tributary, Study Area 1

Figure III.H.7 provides representative cross section views of Study Area 2. The average particle size of the channel substrate below the bankfull channel height ranged from 2.8 mm (very fine gravel) in 2010 to 12 mm (medium gravel) in 2011. In 2013 the average particle size was 8 mm (fine gravel). This area of the stream is predominated by riffles, which accounted for between 47 percent and 54 percent of the reach surveyed. The results of the survey also indicate a degraded channel with low sinuosity, and high erosion potential. More annual variability is noted in the cross sections at Study Area 2 than at Study Area 1.

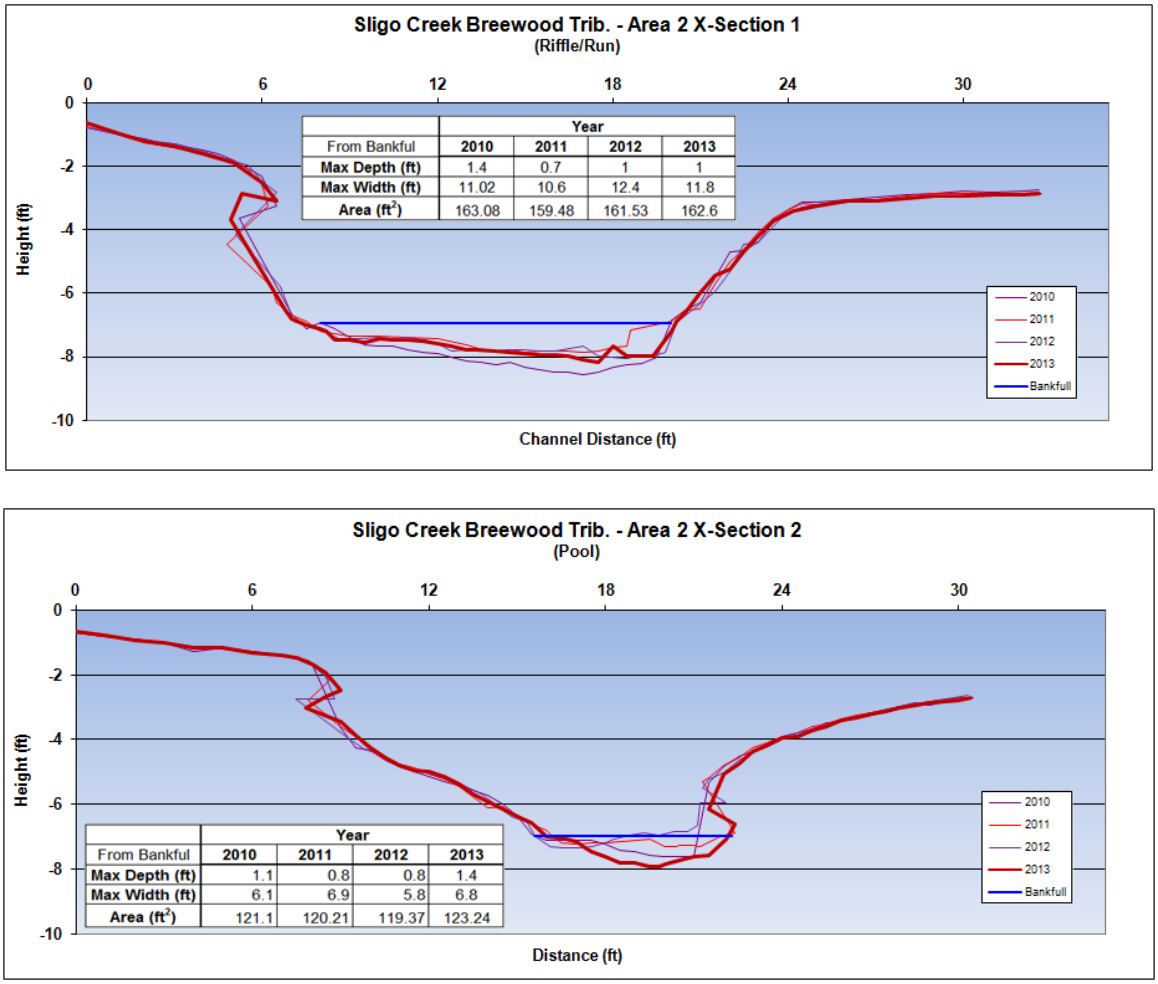


Figure III.H.7. Representative Cross Sections From Breewood Tributary, Study Area 2

Figure III.H.8 provides a photograph of a representative cross-section with Study Area 1, demonstrating the severe down-cutting that has occurred in this part of the Breewood tributary.

Figure III.H.8. Upstream View of Sligo Creek, Breewood Tributary, Study Area 1- Cross Section 1

Summary of Biological and Physical Monitoring of the Breewood Tributary

The 2010 thru 2013 monitoring results document pre-restoration conditions and provide evidence that the Breewood tributary is impaired and will likely benefit from stream restoration. Monitoring will continue annually to evaluate improvements to the biology and habitat that are anticipated as a result of the restoration efforts.

Additional Monitoring: Watershed Restoration Project Monitoring

In addition to the Permit required monitoring, DEP monitors stream restoration projects and some associated stormwater retrofits to assess whether project goals are met and to determine how future projects will be designed and built to ensure a positive impact on the aquatic ecosystem. The purpose of restoration monitoring is to document whether specific project goals have been met and whether desired improvements to the watershed, as a whole, have been reached. Short-term monitoring (usually within 5 years) can often show the effect of a specific project on a stream, but long term monitoring (at least 10 years) is needed to show trends within a watershed.

Montgomery County's watershed restoration monitoring program has evolved over the years to collaborate more with the design of the projects themselves. In the early days of the program, monitoring not as well integrated and resulted in lack of pre-construction data or lack of relevant data in general. Projects are now typically developed with a clear set of quantifiable goals that can be monitored. Monitoring conducted prior to the construction of a project aids in the design of the project. There is adequate time to collect necessary pre-construction data and ensure a sampling design that fits the design of the specific project. Also, after many years of continued

restoration efforts, certain watersheds have had enough comprehensive restoration performed and enough years of monitoring to begin to show cumulative results. These more recent reports are forthcoming and , when available, will be posted on the MCDEP website. The full technical report for FY14 can be found in Appendix L in the electronic attachment to this report.

H.2 Stormwater Management Assessment

The Permit requires the County to assess effectiveness of stormwater management practices found in the *2000 Maryland Stormwater Design Manual* for stream channel protection. During the previous permit cycle, MDE approved DEP's proposal to conduct the required monitoring within a developing area of the Clarksburg SPA. Specific monitoring requirements include an annual stream profile and survey of permanently mounted cross-sections, and comparison to baseline conditions.

The DEP established monitoring stations in two drainage areas; a "positive control" where the drainage area will remain undeveloped and mostly forested and a "test area" where development occurs in the contributing drainage area. The test area is located in the Newcut Road Neighborhood tributary to Little Seneca Creek (LSLS104). The control area is located in Soper's Branch to the Little Bennett Creek (LBSB101). Methodology is described in the County's 2003 NPDES Report, Part III.D2, attached to this report as Appendix M. Figure III.H.9 shows the locations of the two areas and their contributing drainage areas, with the control area shown in yellow labeled "Soper's Branch", and the test area shown in red labeled "Trib 104".

Both drainage areas include a stream gage at the bottom of each study catchment. The test and control areas are also visited once per year to monitor biological conditions, habitat and physical-chemical data. Benthic macroinvertebrates are monitored during the spring index period (March 15 through April 30). Fish were not used as indicators for the small first order streams since frequently there is limited fish habitat.

Figure III.H.9 also shows the locations of three other areas monitored as part of the Clarksburg Monitoring Partnership (CMP), a consortium of local and federal agencies and universities. Two additional test areas were selected for the CMP: one area also in the Newcut Road Neighborhood (shown as Trib109) and one in the Cabin Branch Neighborhood (shown as Cabin Branch). One additional control area (shown as Crystal Rock) was set up in an existing developed area in Germantown. All the test and control areas have USGS flow gages installed, where continuous stream flow data is being collected. Two rain gages monitor area rainfall and document local rainfall intensities to correlate rainfall to stream flow. One gage is located at Little Bennett Regional Park, and the other gage is located at Black Hill Regional Park.

The CMP is using a *Before, After, Control, Impact (BACI) design* or *paired catchment (watershed) design* (Farahmand et al. 2007) approach to assess the land use changes and the impacts to stream conditions. The CMP has been monitoring since 2004. The CMP is also using Light Detection and Ranging (LiDAR) imagery to provide greater resolution in mapping landscape changes at this smaller drainage area scale than is possible using traditional aerial photography.

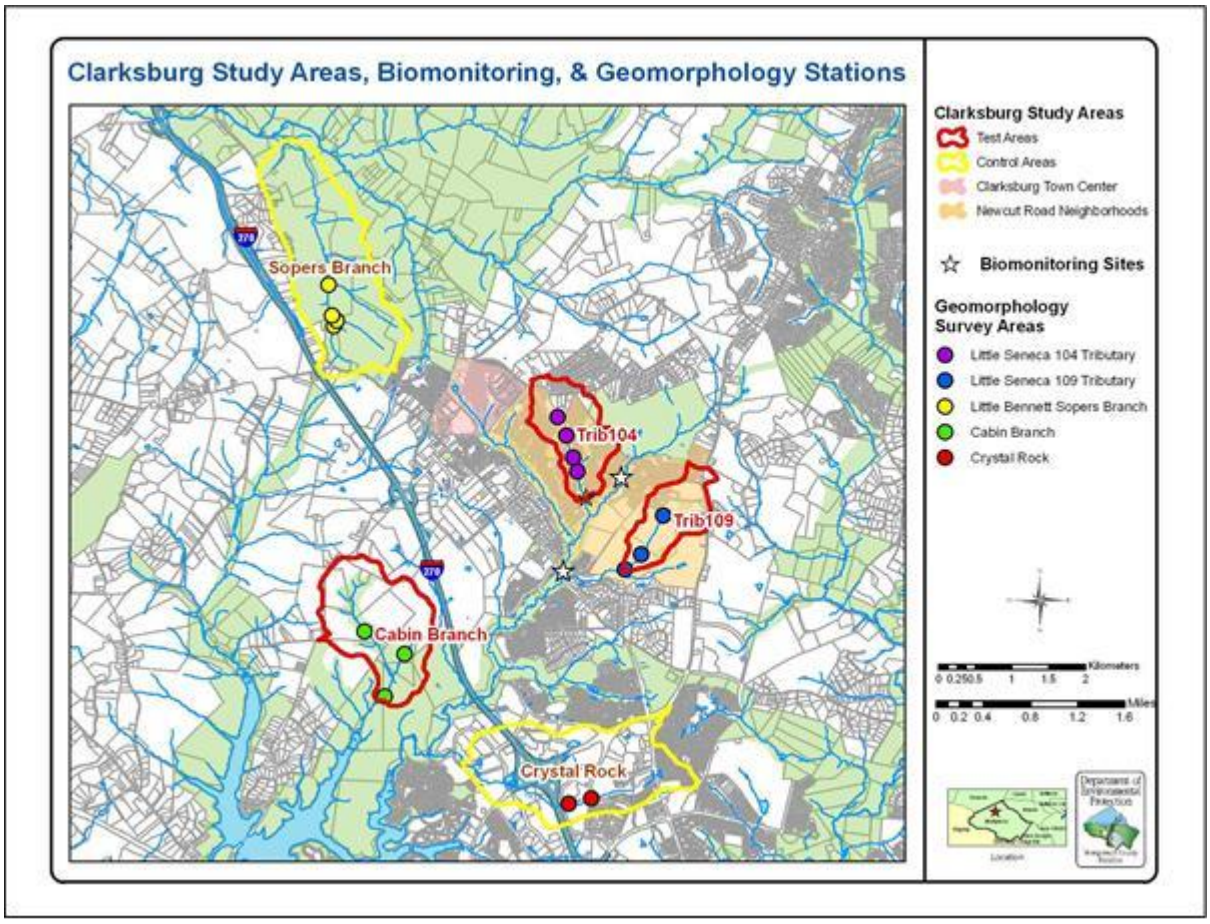


Figure III.H.9. Location of the Clarksburg Monitoring Partnership three test areas and two control areas. Also included are biological monitoring stations and geomorphic survey locations.

The DEP performs additional physical stream characteristic and biological stream monitoring throughout the Clarksburg SPA to study the cumulative effects of development. The County annual SPA report includes the results of stream and BMP monitoring and presents a comprehensive analysis of all available biological, chemical, and physical data collected from 1994 through the current reporting calendar year. The County SPA Report and Technical Appendices are available on the Montgomery County website at:

http://www.montgomerycountymd.gov/dep/water/spareports.asp

Status of Development in the Clarksburg SPA Permit Required Test Area

The drainage catchment to the test area (LSLS104) primarily contains two developments. The Greenway Village Phases I thru IV are completed, and ESC structures have been converted to SWM structures. The Clarksburg Village Phase I recently transitioned from construction to post construction. There are two small portions within the test area (Clarksburg Village Phase II and Greenway Village Phase V) that, although largely stabilized, were still categorized as in the sediment & erosion control phase. The land composition in the control area drainage catchment remains unchanged.

Precipitation, Infiltration, and Annual Flows

Average annual precipitation is about 42 inches in the Baltimore-Washington area (NWS 2008). Average monthly precipitation varies slightly throughout the year but localized spring and summer thunderstorms can cause significant variations in precipitation among nearby locations (Doheny et al. 2006; James 1986). To assure that such localized events were accurately captured, two rain gages were established for the Clarksburg Monitoring Partnership at Black Hill Regional Park in Cabin Branch and Little Bennett Regional Park in Soper's Branch. The data collected provides statistics on pattern and amount of rainfall, storm durations, storm mean intensity, and storm peak intensity.

Hydrologic Data Analysis and Interpretation

Stream flow gages continue to provide data that allows the calculation of instantaneous peak discharge and daily mean discharge as well as stream height response during storm events. Descriptive information on the five flow gages is presented in Table III.H.6.

Table III.H.6. Descriptions of the Five USGS Stream Gages in the Clarksburg Study Area

Gage Id. Number	Name	Date Started	DA (mi^2)	DA (acres)	Closest Test or Control Area
01644371	Newcut Road Neighborhood tributary to Little Seneca Creek Near Clarksburg, MD ("Test Area")	5/2004	0.43	275.2	Test Area (LSLS104)
01643395	Soper's Branch at Hyattstown, MD ("Control Area")	2/2004	1.17	748.8	Control Area (LBSB201)
01644375	Little Seneca Creek Tributary Near Germantown, MD	6/2004	1.35	864	Crystal Rock
01644372	Little Seneca Creek Tributary at Brink, MD	6/2004	0.37	236.8	LSLS109
01644380	Cabin Branch Near Boyds, MD	6/2004	0.79	505.6	Cabin Branch

Annual runoff from stream gages in the test area (USGS gage 01644371) and the control area (USGS Gage 01643395) was compared to rainfall data from the Cabin Branch and Soper's Branch rain gages to determine how much average annual precipitation infiltrates into the groundwater or is released into the atmosphere through evapotransporation within the drainage areas of the gages. Data were obtained from the online Water Year Reports published by the USGS, Baltimore Office (Doheny 2009, personal communication) for water years 2005 thru 2013. Water Years cover the period from October 1 of 1-year to September 30 of the next year.

The 2013 USGS Water Data Report for the two stream gages is available at:

http://wdr.water.usgs.gov/wy2013/pdfs/01643395.2013.pdf (Soper's Branch control area)

http://wdr.water.usgs.gov/wy2013/pdfs/01644371.2013.pdf (Little Seneca Creek test area)

Summary information on stream characteristics at the test area and the control area will be provided in the 2012/2013 Special Protection Area Report. The report will be available on the Montgomery County website at:

http://www.montgomerycountymd.gov/dep/water/spareports.asp

Time of Concentration

Time of concentration (TOC) is defined as the difference in time between the start of rainfall and when discharge begins to increase at the stream gaging station (Doheny et al. 2006). Changes in the TOC of a drainage area can be useful in understanding stream response to impervious area increase. When the conversion process to SWM BMPs has been completed in the test area, TOC will be evaluated to determine if the test area response to rainfall has changed compared to the control area. In this report, DEP evaluated TOC during the construction period in the test area (USGS Water Years 2008 through 2013). Table III.H.7 shows the TOC for the developed test area (LSLS104) stream gage and the control area (LBSB101) stream gage.

Table III.H.7. Time of Concentration in Minutes for Water Years 2008-2013

	Control Station (LBSB101)	Test Station (LSLS104))
Mean	181	86
Median	123	45
Max	1080	720

During the construction period (October 1, 2007 thru September 30, 2013), the TOC was evaluated at the control area stream gage (LBSB101) and at the test area stream gage (LSLS104). On average, the test area tributary responded twice as fast as the control area for the same range of storms exceeding ½ -inch of rainfall (see Figure III.H.10).

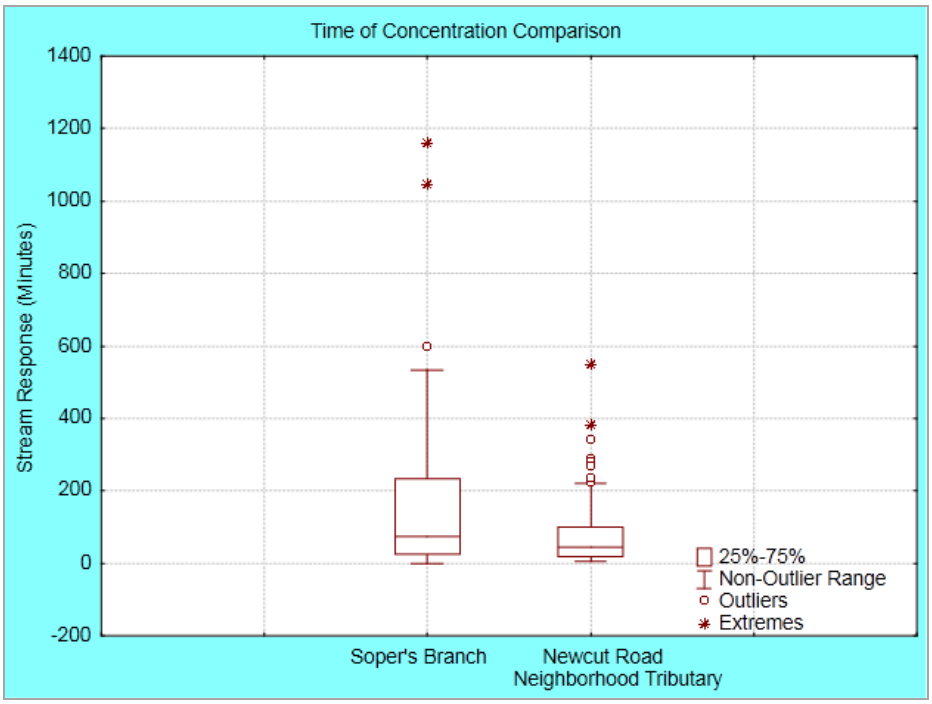


Figure III.H.10. Comparison of Time of Concentration (TOC) at the control area (LSLB101) stream gage and at the test area (LSLS104) stream gage for rainfall greater than 1/2" in 24 hours.

Stream Geomorphology Monitoring

Figures III.H.11 A and B provide survey locations for the stream geomorphology monitoring in the test area tributary and in the control area. Multiple surveys were completed in both areas to document the temporal change in stream channel morphology. Survey information includes longitudinal profiles, cross sections, bed composition (pebble counts), and sinuosity.

Surveys were established within similar habitat sections of each study stream. At that time, the upstream habitat sections were steeply-graded, straight channels (low sinuosity index) consisting mostly of riffle habitat. More downstream sections were characterized by decreasing slopes, increasing sinuosity and pools become more prevalent. There are four channel cross-section locations in both study areas, labeled from 1-4, with location 4 representing the most downstream cross-section location. All cross sections used in this comparison were measured in riffle/run stream areas. Riffle/run areas serve as grade control for the stream and are areas that resist changes to cross-section features.

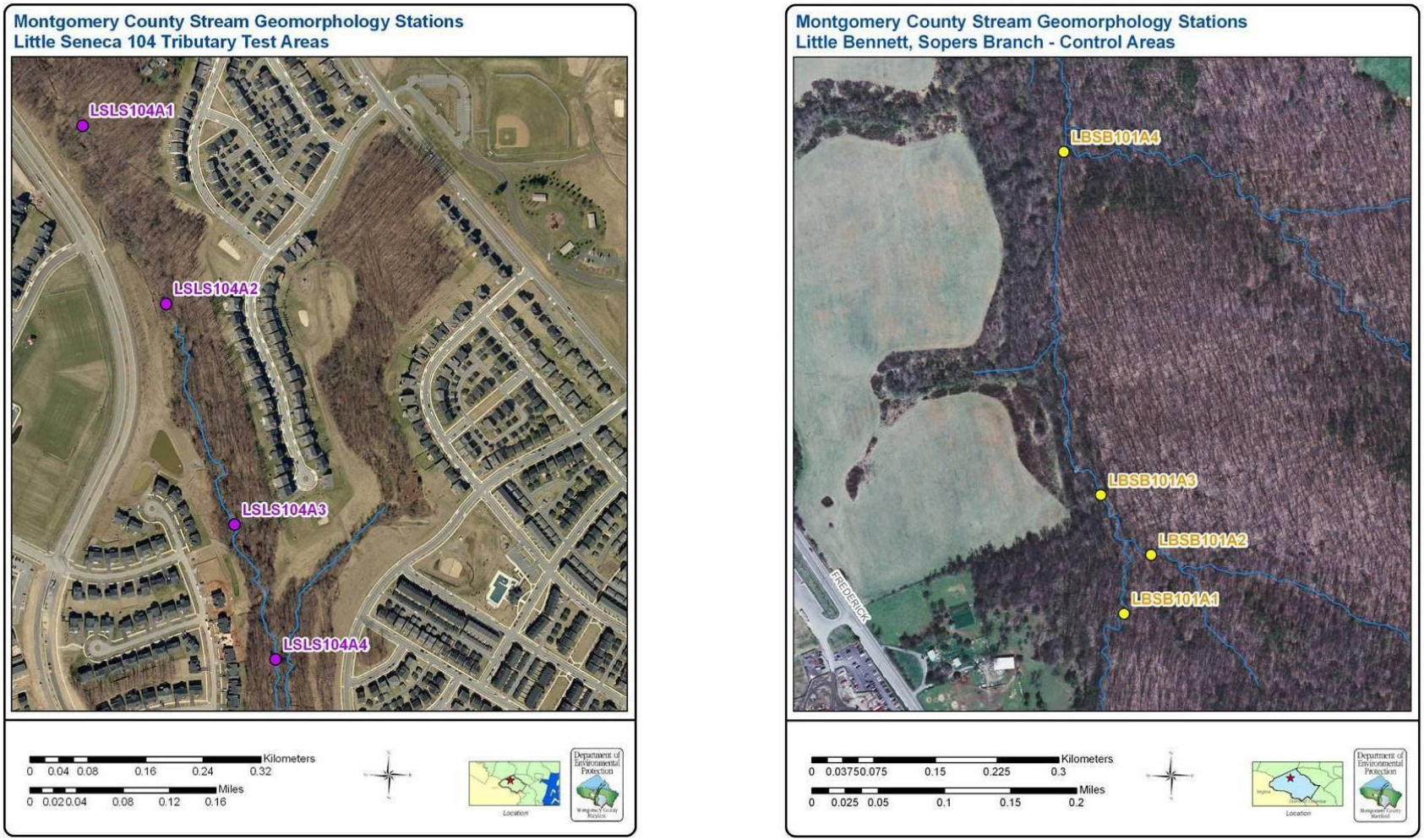


Figure III.H.11. Geomorphology Survey Locations: Test Area (A), Control Area (B)

Data Analysis and Interpretation

As development alters an area's surface hydrology, rainfall infiltration will decrease and stormwater runoff will increase, with corresponding higher peak flows and scour in the receiving stream channel. The eroded material is carried away and deposited downstream (aggradation). As the development site stabilizes, the receiving stream enters an erosional phase where the overland sediment supply is reduced and geomorphic readjustment takes place (Paul and Meyer 2001). To document stream physical changes during development, DEP conducts annual monitoring of cross-sections, pebble counts for average particle size, stream bed elevation, and measures of sinuosity. Table III.H.8 summarizes sinuosity indices and survey information for the test area (LSLS104) and the control area (LBSB101). Data are shown for the furthest downstream survey area within each reach.

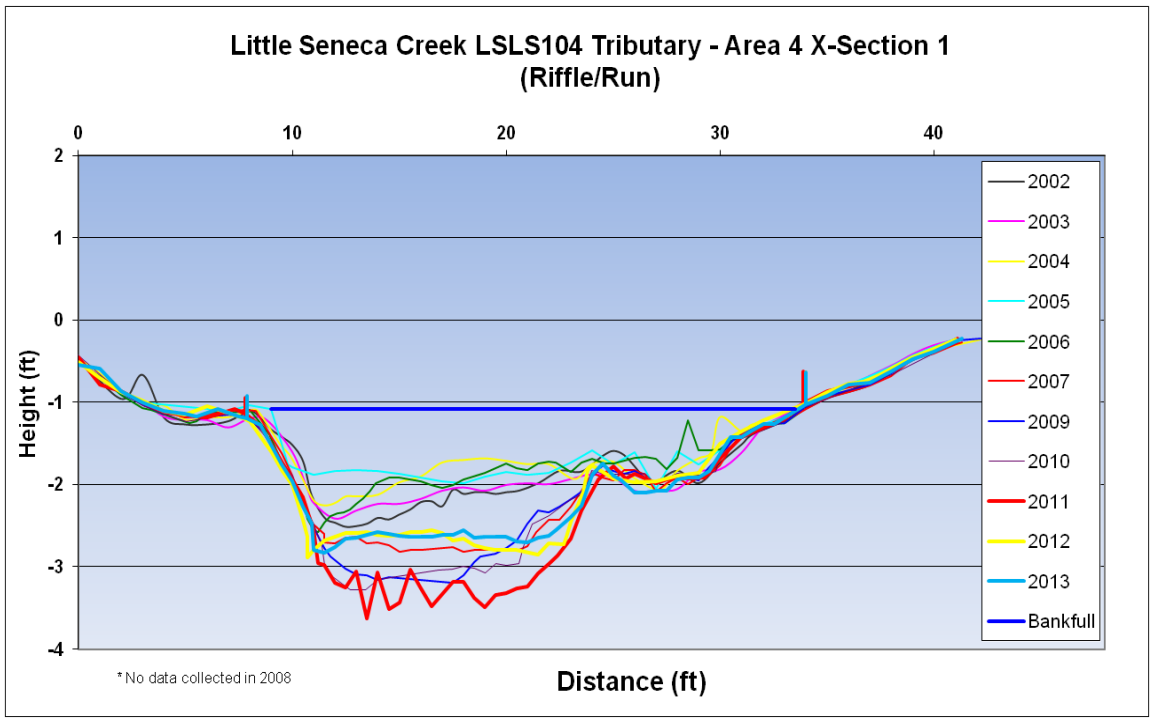
Evaluation of sinuosity over time documents a difference between the test and control stations. Sinuosity is the ratio between the length of the stream and the corresponding length of the stream valley. A ratio of 1:1 would indicate a very straight and channelized stream. From 2003 to 2006 sinuosity ratios went from 1.4 to 1.0. This would be consistent with the increased annual runoff to the test area. After SWM began to be functional in late 2008, the ratio began to increase slightly, and is currently at 1.2. The sinuosity of the control area channel has remained more consistent than in the test area throughout the monitoring period.

The average particle size (D-50) for substrate material in the test area exhibited an increase at the most downstream study area through 2010. In 2011 the average particle size decreased at the test area for the first time since 2004. This corresponds with the beginning of the post-construction period at Clarksburg Village Phase I. The average particle size increased in 2012, but decreased again in 2013. Increased runoff rates during the construction period may have been flushing the finer particles downstream, while the coarser, parent material aggregates of the stream channel were left in place. Increased impervious may also result in a system which prevents sediment from entering the system naturally. To reach equilibrium, sediment is removed from the stream channel in one location and deposited downstream in another area.

Cross sections from the test area illustrate this process on Figure III-H.12. The cross sections generally show channel aggradation corresponding to the most active years of construction (2004, 2005 and 2006), and then channel degradation and some widening from 2007 to 2011 as the test area neared final elevations and stabilization. In 2012 approximately 1 foot of aggradation was observed. In 2013, little change was noted, indicating that the channel may be stabilizing. Changes are most evident in the lower portion of the cross section profiles, at or below frequent storm elevation.

In contrast, representative sections from the control area showed little yearly change (Figure III.H.13).

Table III.H.8. Sinuosity indices and survey information for test area (LSLS104) and control area (LBSB01). Data are shown for furthest downstream survey areas within each reach										
Sinuosity Index (SI)										
Year	‘03	‘04	‘05	‘06	‘07	‘09	‘10	‘11	‘12	‘13
LSLS104 A4	1.4	1.4	1.3	1.0	1.0	1.2	1.3	1.2	.12	1.2
LBSB201 A4	1.1	1.1	1.0	1.2	1.2	1.1	1.2	1.0	1.0	1.0
LSCB201 A3	NA	1.4	1.1	1.4	1.1	1.2	1.2	1.3	1.1	1.1
Total Longitudinal Slope (%)										
Year	‘03	‘04	‘05	‘06	‘07	‘09	‘10	‘11	‘12	‘13
LSLS104 A4	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.3	1.3
LBSB201 A4	1.1	0.9	1.5	1.4	1.4	1.5	1.2	1.3	0.9	1.1
D50 (mm)										
Year	‘03	‘04	‘05	‘06	‘07	‘09	‘10	‘11	‘12	‘13
LSLS104 A4	8.2	5.7	5.7	7.1	8.5	14	20	0.062	8.9	0.062
LBSB201 A4	16	0.062	8.7	14	9.2	0.062	0.062	0.062	0.062	13
D50 (particle)										
Year	‘03	‘04	‘05	‘06	‘07	‘09	‘10	‘11	‘12	‘13
LSLS104 A4	Med. Gravel	Fine Gravel	Fine Gravel	Fine Gravel	Med. Gravel	Med. Gravel	Coarse Gravel	Fine Gravel	Med. Gravel	Fine Gravel
LBSB201 A4	Course Gravel	Silt	Med. Gravel	Med. Gravel	Med. Gravel	Fine Gravel	Fine Gravel	Fine Gravel	Fine Gravel	Med. Gravel



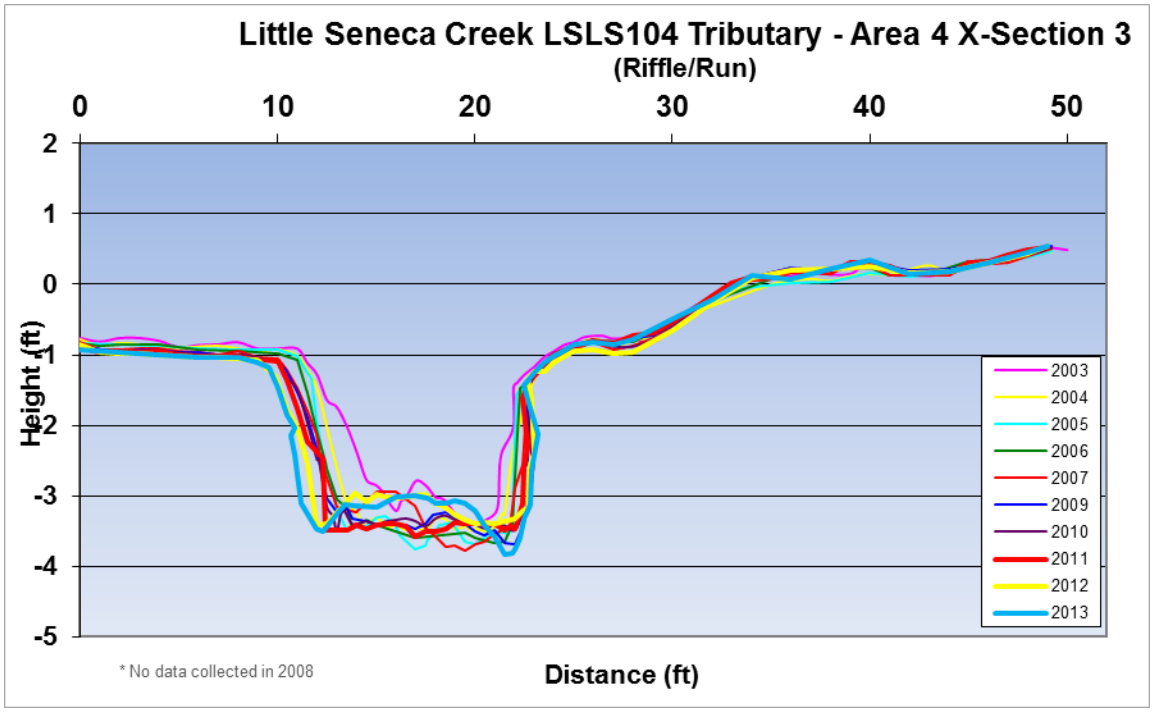
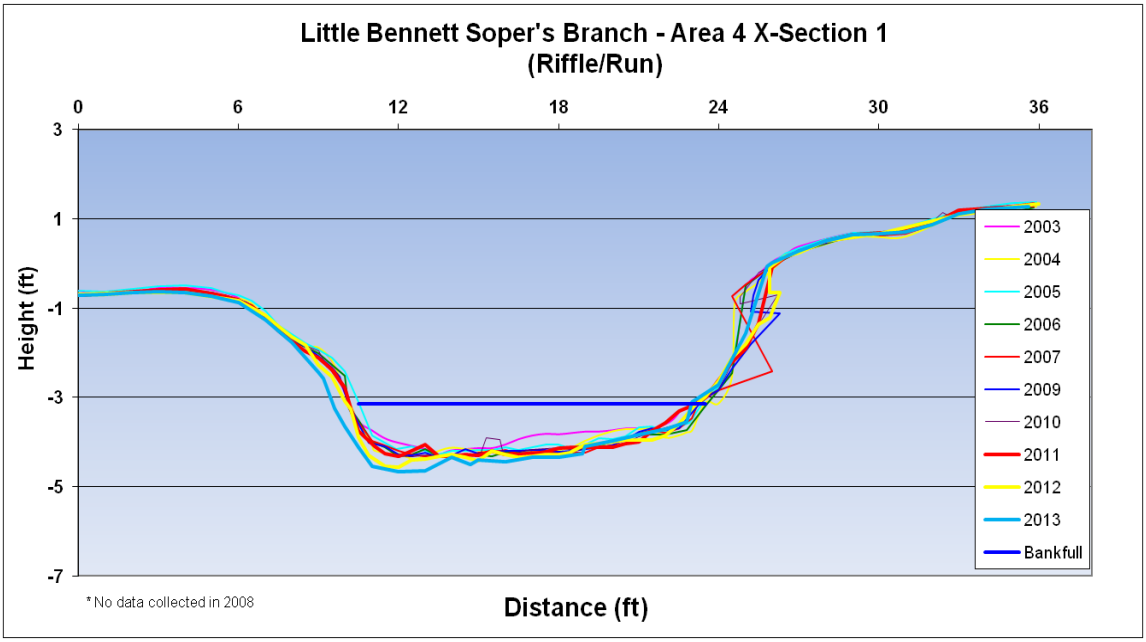


Figure III.H.12. Representative cross sections from the test area (LSLS104), cross section location 4 (most downstream location). Cross sections are both measured in riffle/run features.



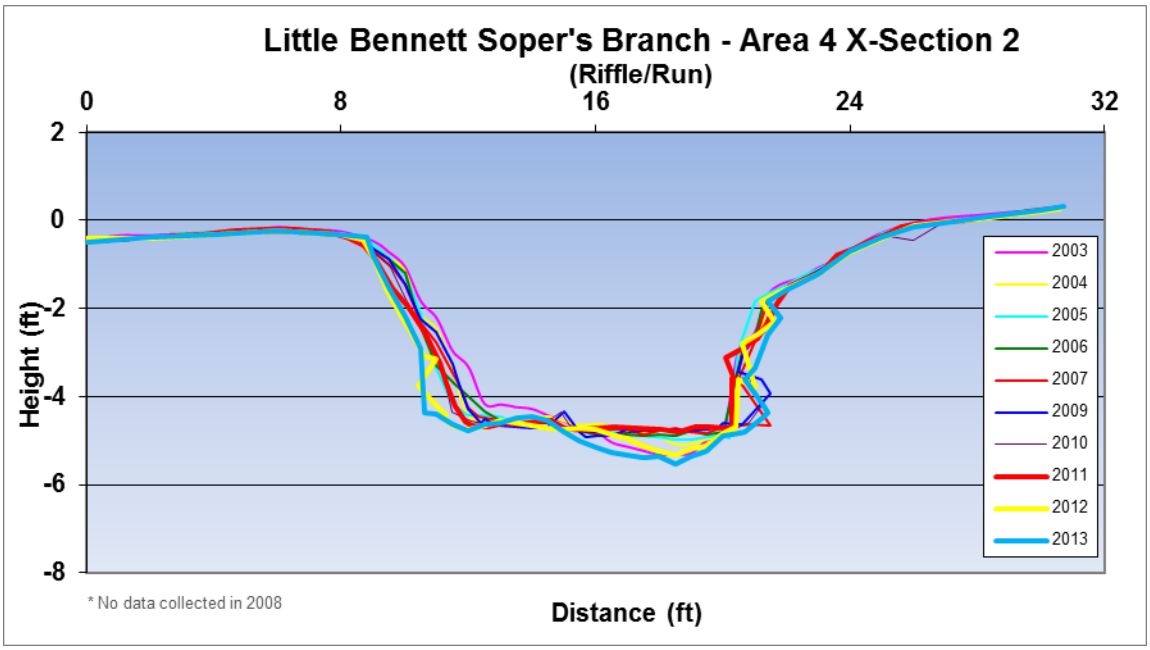


Figure III.H.13. Representative cross sections from the control area, cross section location 4 (most downstream location). Cross sections both measured in riffle/run features.

Figure III.H.14 shows results of longitudinal profiles, looking parallel to the stream channel, for the test area (LSLS104) and for the control area (Sopers Branch), respectively. The stream bed elevation in the test area tributary has shown considerable instability since construction was initiated, and features frequently change as sediment loads move through the system. The channel depth and channel width at the downstream study area has increased since construction began, likely in response to changes in hydrology. Whereas, over the

same time period greater consistency was observed in stream bed elevation and feature type at the control station. The channel area at the control station has also increased, but not as rapidly as at the test area. This is consistent with more stable hydrologic pattern and possibly indicative of less sediment moving through the system. An examination of the percent of riffle/run to percent pool at the test and the control sites revealed no observable trends.

The results presented represent conditions which may still be in a state of flux as the system responds to the conversion from S&EC to SWM structures. Post-construction monitoring has not yet been completed. However, from the preliminary results it appears that the construction phase of development has impacted the test area channel morphology as evinced by straightening, down-cutting, and enlargement of the channel.

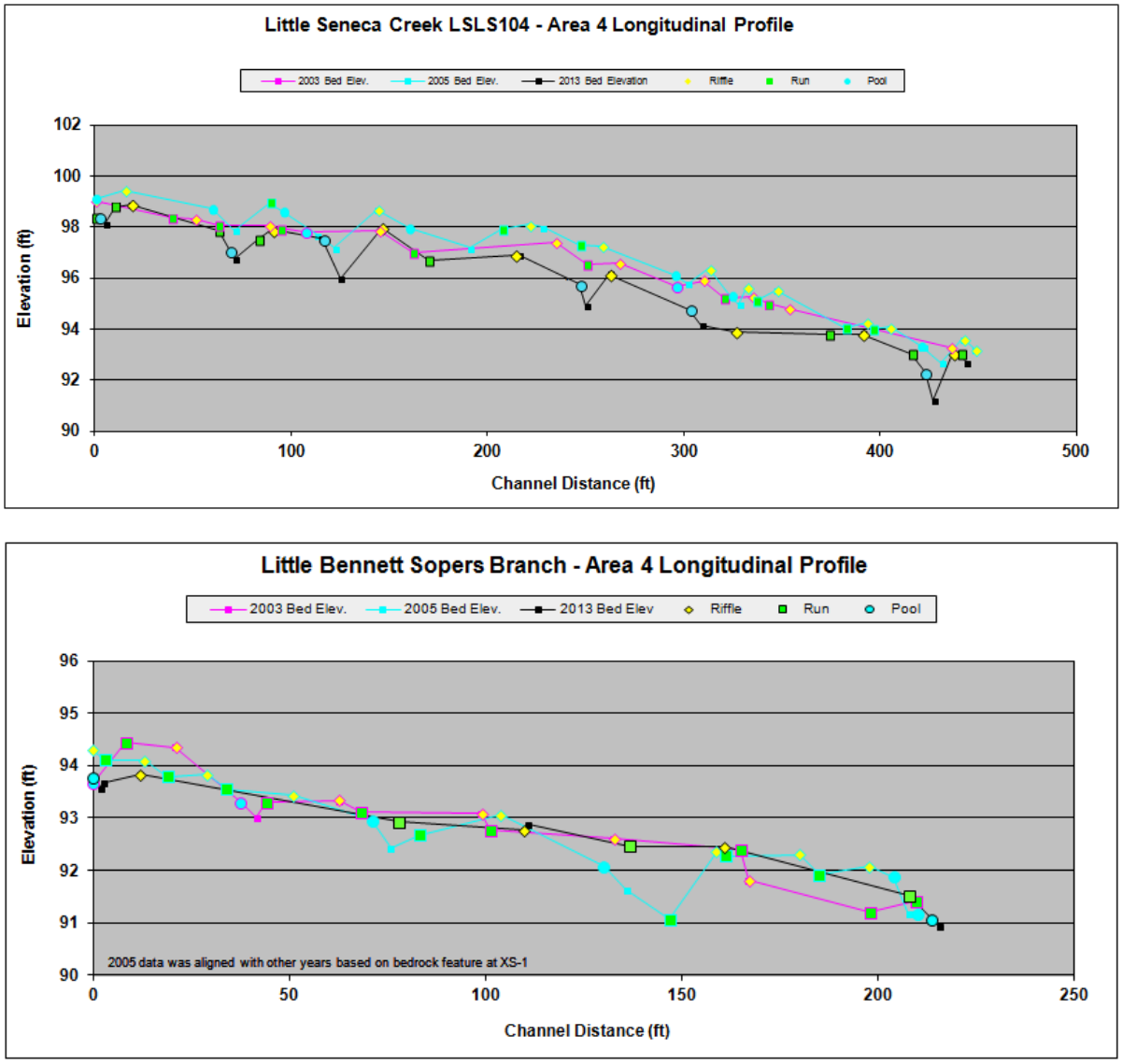


Figure III.H.14. Longitudinal Profiles Test Area (LSLS104) and Sopers Branch Control, Study Area Location 4 (Most Downstream Location).

I. Program Funding

The Permit requires that the County submit annual funding for the capital, operation, and maintenance expenditures in database format specified in Permit Part IV Attachment A, MDENPDES14.mbd, Parts A-L. The required database is included in electronic format in Appendix A, MDENPDES14.accdb., Part L. Fiscal Analysis. A discussion of the CIP budget for stormwater management including watershed assessment and restoration is presented in Part III.G Watershed Restoration.

During FY14, the reported total funding associated with Permit requirements was $51,728,358, an increase of 14 percent over the Permit costs in FY13. For FY13-FY14, DEP is reporting all costs associated with MS4 Program requirements including reporting costs, administrative costs, overhead, and debt service. It does not include operational DOT and DGS costs associated with pollution prevention on County property because these agencies do not have a way to separate out these specific costs from their other operating costs.

Table III.I.1. Total Funding for County MS4 Related Programs By Fiscal Year (in 000s)

Fiscal Year (FY)	FY0	FY11	FY12	FY13	FY14
Total Budgeted	$27,415	$30,097	$30,302	$44,773*	$51,728*
Increase between fiscal years		9.7%	.70%	48%	14%
*Including personnel, administrative and debt service costs not reported FY10-FY12.					

J. TMDLs

The Permit requires the County to develop implementation plans showing how the County will achieve pollutant load reductions to meet WLAs for any EPA approved TMDLs in County watersheds. The WIPs must be developed within one year of the TMDL's approval by EPA. The final revised Strategy includes implementation plans for all those watersheds groupings which had one or more EPA-approved TMDLs prior to June 2009.

A summary of the Strategy's projected progress towards MS4 water quality requirements is presented in Table III.J.1. For TMDL planning purposes, the County is delineated into eight watershed groupings based on the eight-digit USGS hydrologic unit codes (HUCs). Figure III.J.1 shows those watersheds with MDE identified impairments and EPA-approved TMDLs as of January 2014.

Table III.J.1. Summary of the Strategy's Progress Toward MS4 Water Quality Requirements

Countywide Watersheds

Summary of Implementation Plan schedule with expected MS4 permit area WLA compliance endpoints

	2015	2017	2020	2025	2030	Permit/ TMDL Targets 2017	Permit/ TMDL Targets 2020
Impervious Area Treated (acres)	4,302	6,014	7,722	10,518	11,154	6,008	7,723
% of Impervious Area Treated by ESD	18%	34%	47%	60%	63%		
Impervious Area Treatment Cost (Million $)	305	622	987	1,687	1,884		
% of Cost for ESD	53%	66%	70%	80%	80%		
Nitrogen (% Reduction)	18%	25%	36%	46%	51%	9%	20%
Phosphorus (% Reduction)	17%	23%	34%	44%	46%	12%	34%
Sediment (% Reduction)	23%	34%	54%	60%	62%	20%	37%
Bacteria (% Reduction)	11%	15%	20%	28%	30%		
Trash (% Reduction)	18%	26%	33%	41%	42%		

Assumptions:
1. Does not incide repeated Outreach and Education costs beyond FY2015
2. Does not include an inflatoin multiplier

The MDE approved the Strategy in July 2012. The approval letter can be found in the electronic attachment to this report in Appendix B. The County will continue to work with MDE to address any potential technical issues in the Strategy that are inconsistent with MDE modeling efforts. A final version of the Strategy incorporating MDE and public comments including the Watershed Implementation Plans and supporting documents are publicly available on the DEP website at: http://www.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/water/wris.asp#plans

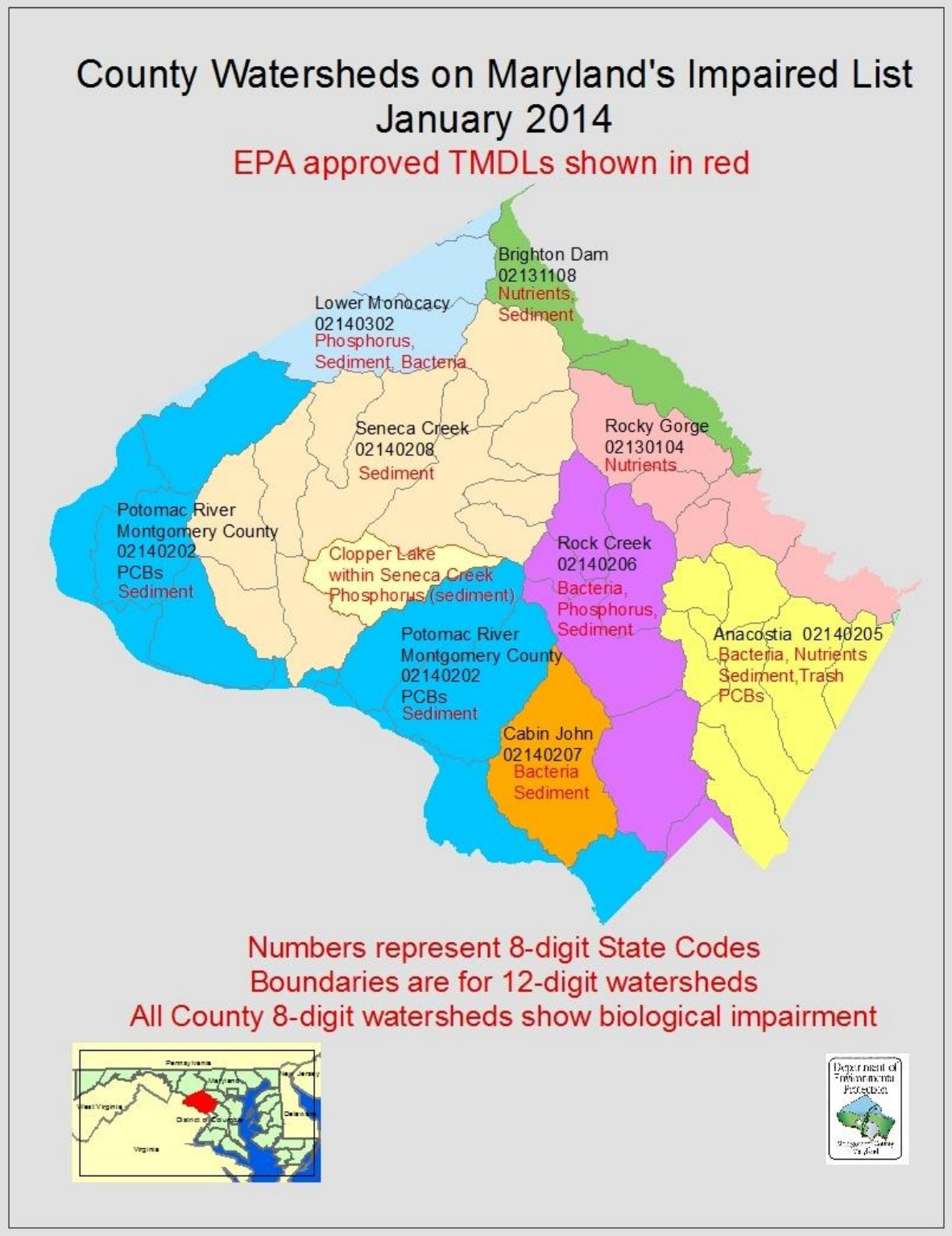


Figure III.J.1. County Watersheds with Impairments and EPA Approved TMDLs

TMDLs Issued Since June 2009

Table III.J.2 shows the TMDLs approved by EPA since the Strategy was developed in 2009.

Table III.J.2. TMDLs Approved Since 2009		
Watershed	TMDL	Status of Implementation Plan
Anacostia	PCB	Implementation Plan Submitted in 2013
Cabin John Creek	Sediment	Required Reductions Shown in Strategy
Lower Monocacy	Bacteria	Implementation Plan Complete 2014
Lower Monocacy	Phosphorous	Implementation Plan Complete 2014
Potomac River Direct	Sediment	Implementation Plan Complete 2014
Rock Creek	Sediment	Required Reductions Shown in Strategy
Rock Creek	Phosphorous	Required Reductions Shown in Strategy
Seneca Creek	Sediment	Implementation Plan Complete 2014

Cabin John Creek Sediment, Rock Creek Sediment and Rock Creek Phosphorous

Three of the new TMDLs; Cabin John Creek sediment, Rock Creek sediment, and Rock Creek phosphorous, will be met by restoration activities implemented as part of the Strategy. Table III.J.3 below compares the baseline loads, WLAs and percent reductions specified by the Cabin John sediment, Rock Creek sediment and Rock creek phosphorous TMDLs.

Table III.J.3. Watershed TMDL Summary				
Watershed/TMDL	Baseline Load for MC Phase I (tons/yr)	WLA (tons/yr)	Target Reduction (tons/yr)	% Reduction
Cabin John/Sediment	3143.6	2430.1	713.5	22.7
Rock Creek/Sediment	8666.7	5345	3322	38.3%
Rock Creek/ Phosphorous	12,503	8,089	4,414	35%

Tables III.J.4 and 5 show the sediment and phosphorous reductions that will be achieved by the Strategy.

Table III.J.4. Summary of the Implementation Plan Schedule for the Cabin John Creek Watershed with Expected TMDL Compliance Endpoints						
Fiscal Year		2015	2017	2020	2025	2030
Impervious Treated (acres)		187	380	570	1,018	1,018
ESD (% Impervious)		52%	72%	78%	87%	87%
Cost (Million $)		23	65	114	215	219
ESD (% Cost)		92%	91%	86%	90%	88%
% Reduction from baseline	TN	21%	27%	39%	55%	58%
	TP	20%	26%	35%	49%	51%
	TSS	6%	17%	60%	91%	100%
	Bacteria	16%	22%	27%	40%	40%
	Trash	6%	12%	19%	34%	34%

Table III.J.5. Summary of the Implementation Plan Schedule for the Rock Creek Watershed with Expected TMDL Compliance Endpoints						
Fiscal Year		2015	2017	2020	2025	2030
Impervious Treated (acres)		1,541	1,961	2,381	3,625	3,989
ESD (% Impervious)		17%	28%	36%	57%	61%
Cost (Million $)		87	172	262	566	658
ESD (% Cost)		70%	79%	79%	89%	90%
% Reduction from baseline	TN	24%	30%	38%	55%	61%
	TP	25%	30%	38%	54%	60%
	TSS	38%	50%	92%	100%	100%
	Bacteria	21%	27%	33%	50%	55%
	Trash	17%	24%	31%	50%	55%

Meeting TMDL WLAs in the Seneca Creek, Lower Monocacy, and Potomac Direct Watersheds

The DEP completed WIPs of the Seneca Creek, Lower Monocacy, and Potomac Direct in FY15. The WIPs show how the County will meet the WLAs of those TMDLs by implementing identified restoration opportunities.

Seneca Creek

Based on the total restoration potential analysis performed using the WTM, it will cost the County approximately $100.74 Million to meet the sediment TMDL requirements. At the current allocation of funds toward the Seneca Creek watershed, and assuming a 5 percent growth rate, the County will meet the sediment TMDL by the 2025-2029 permit cycle.

Similarly for the phosphorus TMDL for Clopper Lake, it is anticipated that the County will meet the phosphorus TMDL by the 2035-2039 permit cycle. The permit cycles with corresponding pollutant reductions are shown in Table III.J.6, below:

Table III.J.6. TMDL Reduction by Permit Cycles for the Seneca Creek Watershed

Impairment	Target Percent Removal	2015-2019	2020-2024	2025-2029	2030-2034	2035-2039
Sediment	44.6%	37.2%	43.7%	51.7%	61.7%	66.6%
Nutrients (Clopper Lake)	45.4%	31.5%	33.4%	38.2%	44.0%	45.7%
Budget (Watershed Subtotal, $ M)		$25.81	$32.92	$42.01	$53.62	$42.05

Lower Monocacy Watershed

Based on the total restoration potential analysis performed using the WTM, it will cost the County approximately $36.1 Million to meet the sediment TMDL requirements. At the current allocation of funds toward the Lower Monocacy watershed, and assuming a 5 percent growth rate, the County will meet the sediment TMDL by the 2035-2039 permit cycle.

Similarly for the phosphorus TMDL, it is anticipated that the County will meet the phosphorus TMDL by the 2035-2039 permit cycle.

The WTM modeling of the Lower Monocacy watershed showed that meeting the bacterial reduction required by the TMDL is not achievable by the restoration practices considered, and that the wildlife load within the watershed exceeds the technology available for removal. The complete suite of practices explored would cost $36.39 Million to implement, which would be exhausted by the 2035-2039 permit cycle.

The permit cycles with corresponding pollutant reductions are shown in Table III.J.7, below:

Table III.J.7. TMDL Reduction by Permit Cycles for the Lower Monocacy Watershed							
Impairment	Units	Target Percent Removal	2015-2019	2020-2024	2025-2029	2030-2034	2035-2039
Sediment	tons/yr	60.8%	13.9%	19.9%	27.0%	33.8%	80.9%
Bacteria	Billion MPN/yr	85.4%	21.7%	28.0%	34.8%	40.0%	43.0%
Nutrients (Phosphorus)	lbs/yr	30.0%	9.1%	13.8%	19.2%	23.7%	37.5%
Budget (Watershed Subtotal, $ M)			$1.39	$1.78	$2.25	$2.89	$27.79

Potomac Direct

Based on the total restoration potential analysis performed using the WTM, it will cost the County approximately $41.59 Million to meet the sediment TMDL requirements. At the current allocation of funds toward the Potomac Direct watershed, and assuming a 5 percent growth rate, the County will meet the sediment TMDL by the 2025-2029 permit cycle.

Table III.J.8 shows the County strategy for meeting the local sediment TMDL for the Potomac Direct watershed.

Table III.J.8. TMDL Reduction by Permit Cycles for the Potomac Direct Watershed				
Impairment	Target Percent Removal	2015-2019	2020-2024	2025-2029
Sediment	36.2%	28.5%	35.5%	43.4%
Budget (Watershed Subtotal, $ M)		$25.53	$32.59	$41.59

Chesapeake Bay TMDL

Information on the County's Phase II WIP submittal for the Chesapeake Bay TMDL is presented below in Part V. Special Programmatic Conditions, A. Tributary Strategy

IV. ANNUAL REPORTING

Annual progress reports are required under 40 CFR 122.42(c). This Permit report fulfills this requirement.

V. SPECIAL PROGRAMMATIC CONDITIONS

A. Tributary Strategy

The DEP continued to serve as the local liaison for activities related to Maryland's WIP process. In July 2014, the MDE published the results of its evaluation of local programs in meeting 2012-2013 Milestones. The County received 'High' ratings for most of these categories including resource enhancements, legal authority, organizational enhancements, and planning/studies. The County's stormwater sector received 'High' ratings in every category. The County received a "Medium" rating in the review category "addresses appropriate sectors (comprehensiveness)" because there were no milestones developed for pollution reduction from the septic sector. The County plans to develop milestones in the septic sector in the future.The complete evaluation is available on the MDE web site:

http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/Milestones/2012-2013/Local/Evaluations/Local_2013_Milestone_Summary_Evaluations.pdf

There were no local meetings held during FY14 related to the WIP efforts. However, the DEP continued to coordinate with the four Phase 2 MS4 Permit localities as MDE moved forward with the next phase in the Maryland WIP process. This included participating in the WIP regional meetings held by MDE in April and November of 2013 and coordinating submission in January 2014 for Phase 2 milestones and local progress. Implementation remains on track as proposed in the WIP Phase 2 document submitted to MDE in November 2011.

B. Comprehensive Planning

The County agencies are routine participants for review and comment as MNCPPC Sector Plan and Master Plan documents are being developed. During FY14, the DEP provided data and analysis of local stream conditions for use in the Bethesda Sector Plan and will continue to participate in the development of the Bethesda EcoDistrict being envisioned. The DEP along with DPS was a lead local agency for technical and policy support during the 2012-2014 process for the Ten Mile Creek area Limited Amendment to the Clarksburg Master Plan and Hyattstown Special Study Area. This process included a watershed-based approach to evaluating existing water quality and potential development impacts to those receiving streams. The County Council took the step of establishing the entire Ten Mile Creek watershed as a Special Protection Area in addition to the protective zoning recommendations from the Planning Board.